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STEEL

The Magazine of Metalworking and Metalproducing

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MESTA

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STEEL

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Welding Dissimilar Metals

Production of Pig Iron—III

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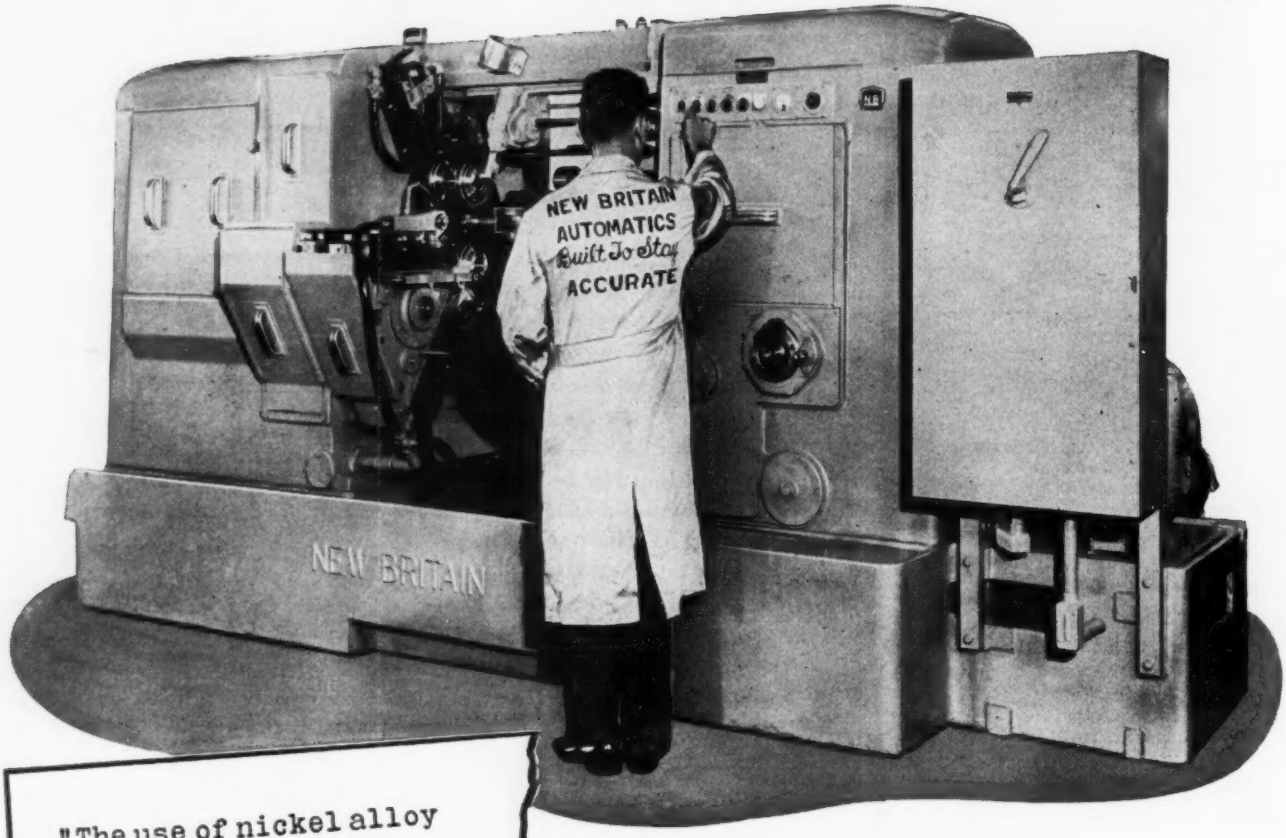
HOW NEW BRITAIN AUTOMATICS

Maintain Operating Accuracy



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THE INTERNATIONAL NICKEL COMPANY, INC.

67 WALL STREET
NEW YORK 5, N. Y.

September 19, 1949

Fine Job, But . . . . .

President Truman's fact finders in the steel dispute—Dr. Carroll R. Daugherty, David L. Cole and Samuel I. Rosenman—performed their difficult task much more expertly than anybody had expected. Union leaders had hoped and steel executives had feared that their findings would be a compromise influenced—perhaps unconsciously but inevitably—by political expediency. It was believed generally that the board would recommend a wage increase of 7 or 8 cents per hour and would suggest that the problems of insurance and pensions be held in abeyance pending further study.

Instead, the board crossed up everybody by issuing a report which in no respect is political. It declared no wage increase is justified at this time and recommended that employers and unions proceed to bargain collectively for agreement on insurance; it recommended a joint study of pension plans to be completed by March 1, 1950. It suggested that the employer pay 4 cents per hour for the insurance fund and 6 cents per hour for the pension fund. It recommended that plans already in existence be brought up to these cost levels.

On the whole, reaction to the board's findings has been favorable except on two points. Numerous authorities believe that the recommendation that the employer pay the entire cost of the insurance and pension benefits is not desirable, inasmuch as almost all experience to date—embracing private, state and federal social security programs in many diverse forms—indicates that joint contributions by employer and employee are sounder and more equitable. A second criticism, voiced chiefly by experienced actuaries, is that the board unwittingly has exaggerated grossly the pension benefits that can be supported by the suggested 6 cents per hour payments.

Regardless of the final outcome of this particular dispute, the excellent work of the fact finders should not blind union leaders, union members, employers or the public to the fact that President Truman's action in setting up this board brought the nation one step nearer to wage fixing by the federal government. It is a dangerous precedent, and unless strong efforts are made immediately to reverse the trend of undue federal intervention in private affairs, we will soon find Washington fixing not only wages, but prices, profits and ultimately every detail of individual and corporate life.

* * *

NEW PRICE REPORTING: In this issue the editors introduce two important improvements in the reporting of steel prices. One is a revolutionary change in the method of quoting finished and semifinished steel products. The other is a new index of finished steel prices which reflects the trend in the composite of 14 steel products more accurately and more scientifically than did this publication's previous price indices.

The new method of quoting steel prices takes into account the current and probable future tendency among producers to post prices f.o.b. mill. For instance, if you are interested in the prices of cold-rolled sheets, the new price tables will give you the prices per pound which the 20 companies which are selling cold-rolled sheets are quoting at the 18 points where this product is rolled. By checking the quotations at the various localities against freight rates, customers can easily determine where they can buy advantageously. Also, in every instance, they can identify the name of the supplier—an important bit of information that has been available only occasionally under the orthodox methods of reporting prices. Many sellers and buy-

(OVER)

AS THE EDITOR VIEWS THE NEWS

ers of steel products who have examined advance proofs of the new price tables are enthusiastic about the possibilities of the improved method of quoting.

The new price index takes the weighted prices of 14 products from 1935 to 1939 as 100. For practical reasons, Pittsburgh prices are used for the composite. Today's index is 152.52, indicating that finished steel prices now are 52.52 per cent above the average for the base period.

—pp. 54, 55, 127, 128-131

* * *

HOPE FOR SPONGE IRON: Sponge iron processes command increasing attention because of the obvious need of economic substitutes for pig iron and scrap in steelmaking. Necessity probably has spurred more intensive research with sponge iron in Europe and Asia than in the United States.

In Sweden, experimenters have been developing a sponge iron process which is noteworthy in that the reduction agent is almost completely utilized for reducing and heating the ore. Important is the fact that energy is supplied by combustion of some of the fuel by oxygen gas or oxygen-enriched air, thus obviating the use of electric energy. The Wiberg-Soderfors process, which claims this advantage, is one of several that is attempting to get the cost of sponge iron down to a level that is truly competitive with pig iron and scrap on a commercial basis. Some day this objective will be attained. —p. 72

* * *

BLAST FURNACE DETAILS: Included in Part II of the article on "Production of Pig Iron," by B. M. Stubblefield, Youngstown Sheet & Tube Co., is an interesting tabulation of the principal materials required for the construction of a 1200-ton blast furnace and the required three stoves, cast and hoist houses, gas cleaning equipment and slag pit.

Among these requirements are 5130 cubic yards of concrete and 227 tons of reinforcing bars and anchor bolts for the foundation, 3087 tons of shapes and plates, 200 tons of steel pipes and valves, 250 tons of cast iron plates, 335 tons of other cast iron and steel parts, 50 tons of copper for tuyeres, 2,150,000 refractory bricks for the stack and 900,000 for the stoves, 110,000 square feet of insulation block and 800 tons of fire clay. The foregoing does not include materials for ore storage yard, power house, railway facilities or other adjuncts.

The article deals authoritatively with numerous details of blast furnace construction, operation and maintenance. —p. 88

* * *

STEEL BACKLOGS GROW: Replies to a questionnaire sent to representative steel consumers by this publication show that 41 per cent have sufficient steel on hand to operate from 30 to 60 days, 21 per cent can run 60 to 90 days and 18.5 per cent can continue more than 90 days. Stocks sufficient for only ten to 30 days are held by 18.5 per cent and companies having less than ten days' supply are only 1 per cent of the total.

This seems to confirm the reports in recent weeks that many steel consumers—particularly in the automotive field—were buying beyond ordinary needs in anticipation of a steel strike. The figures on inventories indicate that if a strike is averted, some curtailment in steel buying can be expected. However, optimism and confidence engendered by a peaceful outcome of pending negotiations probably would reduce the severity of this curtailment to an appreciable extent. —p. 46

* * *

INSTRUMENTS CUT COSTS: About 9000 engineers, executives and technical men attended the Fourth National Instrument Conference and Exhibit at St. Louis sponsored by the Instrument Society of America. The show and the technical sessions, in which six other organizations co-operated, emphasized the growing importance of instrumentation in the industrial progress of the nation. Success of the affair is impressive because the Conference and Exhibit was organized as recently as Jan. 10, 1946.

This is not surprising. Use of instruments cuts horizontally across all branches of the metalworking industry. The keynote of the St. Louis meeting—that "instrumentation reduces costs"—is realistic. Whenever instruments can be introduced to "see more, hear more, think faster and toil more tirelessly than human beings," there is a gain in efficiency and a welcome opportunity to reduce costs. —p. 53

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

BASIS FOR SETTLEMENT—Recommendations by the steel fact-finding board that steelworkers be granted a social insurance plan in lieu of a fourth-round wage increase is expected to provide a basis for settlement of wage disputes in steel and many other basic industries (p. 43). Negotiations on pensions have been held over until 1950 although joint labor-management studies of the pension problem are to start soon. The board's recommendations and their expected acceptance by labor and industry will give widespread recognition to the principle of allowances for human depreciation.

COST CHALLENGE—A wage settlement on the basis of the steel board's findings would challenge industry to reduce prices, and the only way this can be done is to cut costs (p. 45). The board bluntly states that the steelworkers would be justified in asking for another round of increases if industry's expected efficiencies stemming from modernization and other means don't result in lower prices. Metalworking companies are already acting on the cost problem in the areas of research, engineering, administration and personnel practices.

HUGE OPEN HEARTH—Weirton Steel Co. has begun operating a giant, 550-ton, open-hearth furnace, three times the size of the average unit (p. 48). Late in August another National Steel Corp. division, Great Lakes Steel Corp., lit a king-size furnace of about the same capacity. National Steel may set a new trend in open-hearth construction if savings in steel production costs result from the action.

BUSINESS OUTLOOK BETTER—Labor peace would spur business (p. 47). A buying freeze brought on by the lengthy pending status in steel negotiations is already beginning to thaw for consumer goods and may start for capital equipment early in 1950. Reasonably stable wages and prices, possible for the first time since the war if steel settles with the union, are a requisite for an industry expansion phase in America's postwar economic cycle.

STEEL BUYING LULL?—STEEL's survey of users shows that many bought steel in anticipation of a strike (p. 46). Findings indicate that some curtailment in buying is likely even if there is no labor strife. A slight drop could occur in the ingot production rate.

SMALL CAR—Kaiser-Frazer Corp. has a mockup for a new small car which is said to be spectacularly different in design from anything yet developed by auto stylists (p. 57). Placing the job in production is something else because several million dollars would be required for new tooling. Many think that K-F sorely needs a small, inexpensive car for its line before it can get on a stable financial basis.

NEW PRICING METHOD—With this issue STEEL inaugurates a new, broader method of price reporting (p. 55). Closing quoted prices of 150 producers of finished and semifinished steel products in more than 125 classifications will be listed, as well as the producers and the location of the producing mill . . . Another revised feature beginning this week is a new weighted index of finished steel prices based on valid statistics and economic premises (p. 54).

HERE AND THERE IN INDUSTRY—Bureau of Mines has estimated costs and steel tonnages necessary to build synthetic fuel plants (p. 50) . . . There is no immediate prospect that "phantom" orders for machine tools will be activated, National Machine Tool Builders' Association says (p. 47) . . . Truck sales continue to lag (p. 57) . . . Promise given at the dollar talks of more American capital for the sterling area may prime the pump for an increased flow to France, Belgium and Western Germany (p. 53) . . U. S. dependence upon Russia for manganese may disappear as the result of a new beneficiation process which can extract the metal from low-grade ore (p. 48) . . . Lustron Corp.'s chances of getting a new $14.5 million loan from the RFC are considered good (p. 52) . . . . Budds Aero Castings Inc. has developed a process which simultaneously casts, molds, forges and coins a product to the finished state (p. 60).

Engineering News, p. 71 *Market Summary, p. 127*

Steel For My Lady's Gown

Hidden within the glamorous fabric of my lady's gown is a story of steel—and steel service.

Tiny steel hooks and eyes . . . steel zippers and snap fasteners aided in achieving lines of beauty. Steel needles, pins and shears helped to fashion the dress. Steel spinning machines and looms played important roles in creating the soft, luxurious fabric. Chemical apparatus, much of it stainless steel, cradled its synthetic yarns, its colorful dyes.

Very probably Ryerson Steel Service also played an important part in bringing my lady her gown. Because the many thousands of Ryerson customers include needle makers . . . machine makers . . . textile mills . . . dye companies . . . and quite probably the automobile company whose steel truck delivered the gown to her home.

Ryerson Service has met the myriad steel needs of industry for over 100 years. Thus Ryerson has contributed, in no small measure, to the efficiency of American business and the continued rise in standards of living.

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STEEL
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Head for Social Benefits Showdown

Contributory vs. noncontributory plans chief issue between basic steel producers and union as they move toward new negotiations. Fact-finding board vetoes wage increases

BASIC steel producers and the United Steelworkers are heading toward a showdown on industry-financed social insurance and pensions. Following the steel fact-finding board's recommendations that no fourth-round wage increase be granted but that the companies pay for insurance and pension plans, the industry agreed to resume negotiations.

Early agreement generally is expected, although President Philip Murray of the union late last week was disputing the degree of the industry's acceptance of the board's recommendations. The argument arises from the industry's contention that pension and insurance plans should be on a contributory basis.

If a peaceful settlement is reached in steel, such an agreement will have a profound influence in the settling of wage disputes in other industries.

Early agreements in steel and other metalworking industries is expected to generate renewed confidence on the part of buyers of both consumer and capital goods. Purchases delayed pending resolution of the wage dispute may then be made. The anticipated release of new buying may well hasten progress toward the third phase of the postwar economic cycle—expansion.

Industry observers believe that the board's recommendations for limiting pension costs to the companies to $120 per employee per year may facilitate the 1950 labor settlement. Thus in effect, the board may have outlined the settlement for two years.

The Recommendations

The board's recommendations, while not especially pleasing to either labor or management, generally are conceded to be moderate and nonpolitical. Industry men were frankly surprised that the board turned thumbs down on money wage increases. The union accepted the recommendations with "profound regret" that nothing was to be put in the pay envelope.

The recommendations:

1. No wage increase. The board told the steelworkers they have fared pretty well in the matter of pay increases, as compared with other workers, stockholders and consumers.

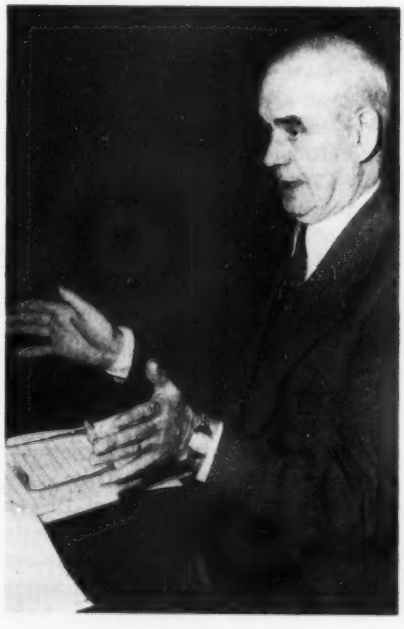
2. Social insurance programs, costing $80 a year (4 cents an hour on a 2000-hour year) to be paid for by industry. Where companies already have social insurance programs, the total cost would be brought up to $80 a year; the $80 package is not to be piled on top of programs already in effect.

3. Launching of a joint labor-management study on pensions. The board suggests that this should be completed by Mar. 1, 1950, and that negotiations should start on a pension program where present contracts expire. The panel suggests that industry should ante $120 a year (6 cents an hour on a 2000-hour year) to finance pensions. According to union figures, the board points out, this amount would buy about $70 a month of retirement benefits. The union's pension cost estimates are disputed by industry and by independent actuaries.

The Reaction

Management is frankly gratified that the board refrained from advocating a wage increase.

The social security benefits recommended represent larger increases for labor costs than the companies believe should be granted.



STEELWORKERS' MURRAY
. . . . accepts with "profound regret"

The United Steelworkers publicly accepted the recommendations with "profound regret" that a wage increase was not recommended. Privately, many labor leaders believe they have won a victory.

Labor men believe they have won recognition of the principle of allowances for human depreciation.

Although the benefits suggested by the board are less than those asked by the union, labor leaders believe the benefits can be enlarged in the future.

Costs of Proposals

The board estimates the maximum cost of its social insurance and pension recommendations would be $200 a year, or 10 cents an hour if a full 2000-hour year were worked. This would be reduced by any amount the companies now are spending for social insurance or retirement programs. The board estimates roughly that the steel industry now is spending about 2 cents an hour for such welfare benefits and that the net average cost to the basic steel producers would be about $160 a year, or 8 cents an hour.

Industry people have little argument on the board's estimate of social insurance costs. A fairly comprehensive social insurance program can be purchased for $80 a year, although the union's original demand was for a program costing about $125 a year.

Industry estimates the board's proposals would raise steelmaking costs by about $3 a ton.

Union estimates of pension costs (the board used union cost estimates in the absence of representative statistics from the industry) are disputed loudly. Many companies contend that costs for the pensions asked would be double or triple union figures.

The board uses the union estimates with tongue in cheek and recommends only that the sum stated be expended for these purposes. If the costs are greater than stated by the union, benefits would be curtailed.

Many metalworking companies now have more liberal social insurance programs than have the basic steel producers. Of 363 companies recently surveyed in Cleveland, more than two-thirds have insurance programs, ranging from group life to comprehensive coverage. Many of these programs approach or exceed $80 a year.

A substantial number are contribu-

REUTHER'S AUTO WORKERS
. . . . pension, wage case weakened

tory plans. The board recommends that industry pay all the costs.

Joker in Pensions

While the issue of social insurance is fairly simple and negotiations will be marked chiefly by debate on contributory vs. noncontributory plans, management will approach the pension problem warily.

Pension cost figures presented by the union, and adopted, with qualifications, by the fact-finding board, are questioned sharply by the companies and by independent actuaries and pension consultants.

Originally, the union asked for $125 monthly pensions at age 65, plus $150 monthly disability allowance for workers disabled before reaching retirement age. Union estimates such a program would cost 11.27 cents an hour for a 2000-hour year.

Pensions consultants retained by the companies contend the assumptions used by the union in arriving at these figures are loaded with fallacies. Cost figures for such a program for individual steel companies, as set up by independent actuaries, range from around 23 cents for the larger companies up to about 50 cents an hour for some of the smaller concerns.

The pension recommendation of the fact-finding board calls for expenditure by the industry of $120 a year, or 6 cents an hour. Such an amount, the board says, should provide about $70 a month, on the basis of the union's cost estimates.

The industry and their actuaries believe the cost for $70 a month pension would be double or more the figure used by the board.

The board expresses doubts as to the accuracy of the union's estimates, but say they lacked sufficient data on which to base an independent estimate. Board members recommend that "the cost be limited to $120 a year per employee or 6 cents an hour for a 2000-hour year, and that the parties undertake to buy as much in pensions benefits as this figure will cover."

Recognizing the complications and the long-term commitments inherent in pension programs, the board suggests that the companies and the union undertake a joint study of the problem. Such a study, the board observes, should be completed by Mar. 1, or 60 days before negotiations on pensions get underway.

Should Workers Contribute?

The board recommends that both insurance and pension plans should be noncontributory, i.e. that the companies should pay the entire cost.

Industry holds that the plans should be contributory, with workers and the companies sharing the costs.

The companies point out that the principle of contributory plans has been firmly established and accepted in the federal social security act and in the majority of insurance and pension programs now in effect.

In the negotiations on insurance and pensions, the industry will continue to urge that the plans be on a contributory basis. Particularly in the pension negotiations will this be a critical issue.

Auto Peace Expected

Prospects of peace in the steel industry labor relations seem to indicate that a similar situation will develop in the automotive industry. Negotiations between Ford and the UAW-CIO which have been more or less marking time pending the outcome of the steel talks now should come to a climax. Most of the details on such subjects as working conditions have been ironed out and, with wage increases apparently no longer in contention, a finalized contract will not be long in coming.

Meanwhile the threat of a strike at Chrysler plants is less serious, despite the fact that a strike vote has been asked, as well as at Briggs Mfg. Co. Principal point of dispute at these companies is over whether pensions are bargainable under terms of the contract. Managements have declared they are not but the union is insisting they are.

There has been a noticeable clearing of the tense atmosphere prevailing in automotive labor circles, directly attributable to the easing of the steel industry problems.

UMW Fund Running Low

John L. Lewis, who supplied impetus for the pension drive for mass production workers when he forced the miners' welfare fund on coal operators, is having trouble with his fund. By his own admission, the fund is running low.

The three-day week which he forced on the coal industry has curtailed royalty income as coal production drops. Demands for benefits continue to grow. Increasing numbers of coal operators are refusing to pay royalties in the absence of a contract. They say: "No contract, no royalties," giving a unique twist to Lewis' oft-repeated dictum: "No contract, no work."

Lacking adequate reserves, the fund soon may be exhausted, and Mr. Lewis is worried. Late last week, he threatened to strike mines whose operators are withholding royalties.

Alcoa's Workers To Vote

Nearly 3700 production and maintenance employees in Alcoa's Pittsburgh district plants will go to the polls Sept. 20 with AFL and CIO-United Steelworkers contending for bargaining rights. On the ballot will be the CIO - United Steelworkers, which now have an extended contract with Alcoa, and the AFL, no union designated. There will also be a space for any employee who wishes to vote "neither."

LEWIS' COAL MINERS
. . . . welfare fund runs low

Next Step: Cut Costs

Employment expense raised by new labor agreements, but industry is warned to cut prices

INCREASED pressure for reducing operating and production costs to enable price cuts is being brought to bear on industry.

Labor agreements to be reached under the recommendations by the steel fact-finding board call for higher labor costs. Yet the board warns the steel industry that unless prices are reduced, to reflect increases in efficiency, the union will be warranted in coming back to ask for a money wage increase. The board holds that spending of current profits for expansion and modernization of plant and equipment is proper, but says the savings effected by the resulting increased efficiency should be shared with the consumers of steel in the form of lower prices.

More competitive markets already are forcing price concessions in many lines.

Industry can meet the challenge of prices only by whittling costs. A study of this problem by the National Industrial Conference Board reveals that one dollar spent in research and engineering may earn two, that industry can lose a lot of fat in administrative and personnel areas of operation.

Research, Engineering — Broader research programs, the conference board finds, can bring new products, improved products, utilization of waste materials, substitution of cheaper materials. More intensive engineering reveals the need for more materials handling equipment, additional instrument and control apparatus, newer production equipment, stricter quality control methods, cheaper and more efficient packing techniques and more standardization. Many metalworking companies have already begun implementing research and engineering findings.

One subject getting increased administrative attention is relocation of certain operations nearer consumer markets, sources of raw materials and favorable labor supplies. Quick turnover of inventory is essential to any cost-reduction program. Increased use of inventory control and production planning techniques—more possible now in a more stable economy—can chip away at costs. Disappearing are many expensive practices, like air-expressing parts, which were followed during the war and the immediate postwar period. Office expenses can be cut by fewer telephone calls, less traveling, simpler sales entertainment. Closer scrutiny of plant housekeeping has resulted in cost savings.

In personnel practices many companies are saving money by forbidding unnecessary overtime work, downgrading supervisory employees no longer needed in that capacity and overhauling their production incentive plans. Suggestion systems are gaining in popularity.

Economies Aid Hamilton

Greater plant efficiencies and manufacturing economies are having a salutary effect on sales and net profits of Hamilton Watch Co., Lancaster, Pa.

Hamilton's prices haven't advanced in spite of higher labor rates which went into effect in November, 1948, and resulted in substantial increases in the company's wage bill. Indications are that net income for the first nine months and for all 1949 will compare favorably with results for the two periods last year. Net profit for the first three quarters of 1948 aggregated $789,548 on sales of $12,997,737. For all of 1948 net profit totaled $1,396,702 on sales of $19,983,485.

AMA Studies Office Costs

One thousand office executives in manufacturing, wholesaling and retailing companies will convene at the Hotel Statler, New York, Oct. 20-21, to discuss cost reduction at the annual meeting of the Office Management Division of the American Management Association.

All seven sessions of the two-day meeting will be devoted to an exchange of information on how companies are reducing office costs currently without affecting efficiency. Methods to be discussed will include improved procedures for keeping records, maintaining files, bookkeeping, mechanization, layout and space control and more effective use of human resources.

Steel Earnings Higher

Despite the sharp drop in steel production during July, the average hourly earnings of the steel industry's wage earners rose to $1.699 in that month, from $1.684 in June, American Iron & Steel Institute announces. In July, 1948, the average was $1.645.

The industry's payroll in the first seven months of this year, estimated to be $1,321,373,000, was 7 per cent larger than in the first seven months of 1948. Estimated total employment, 639,000 persons in the first seven months of this year, was about 10,000 larger than in the like part of 1948.

The payroll in July was $160,301,000 against $181,787,000 in June. July employment was 609,600, against 624,500 in June. Wage earners' hours of employment averaged 31.8 in July, compared with 37.6 during June.

Packaged Savings

NATIONAL Screw & Mfg. Co., Cleveland, and other fastener producers, are cutting costs at least 5 per cent with new packaging techniques.

National's hardware packing cuts costs 5 to 7 per cent by reducing stock handling, warehousing and shipping expense. Hardware packing is destined for jobbers and distributors who deal in small lots with hardware stores and industrial companies whose fastener needs are slight. The method, adopted early this year, makes use of a carton containing separately wrapped packages which can be removed without repacking the carton. Weighing 25 to 30 pounds, each carton contains one size and type of bolt. All sizes of carriage, machine and lag bolts and cap screws can be packed in this manner.

Hardware packing won't supplant standard case packing which still is the best method for purchasers buying in large lots direct, but it will supplement the older technique.

Toulmin Studies Antitrust Laws

UNDER the cloak of sweeping generalities in our antitrust laws, a majority of the Supreme Court could convert our society from a democracy to anything it wishes, Harry A. Toulmin Jr., attorney, industrialist and author, declares in the foreword of his new seven-volume treatise on the U. S. antitrust laws, published by W. H. Anderson Co., Cincinnati.

"The broad charter of business and commercial regulation possible under these laws, and the several dozen satellite statutes," writes Mr. Toulmin, "makes it possible to regiment business, industry and commerce." Recent Supreme Court philosophy, declares Mr. Toulmin, is to the effect "that the court is charged not with the role of a balance wheel and as an arbitrator in the interpretation of the law as it is, but rather as a super-executive agency" to guide the nation by judicial decision. "Only Congress, responsible to the public will, remains the bulwark of our liberties."

Lull in Buying?

Survey of consumers shows many bought steel in anticipation of industry strike

IN ANTICIPATION of a steel strike did metalworking companies lay in steel to an extent that they will sharply curtail buying and reduce inventories now that prospects are bright for averting the strike?

A survey by STEEL indicates some curtailment in buying is likely. Severity of this curtailment may be reduced if ultimate peaceful settlement of the labor controversy produces optimism and confidence among buyers.

A modest drop could occur in the steel ingot production rate and the tonnage output would still be above the average weekly level of 1939. The weekly production average of 1,015,359 net tons that year is equivalent to only 55 per cent of today's weekly capacity of 1,843,516 tons of ingots and castings. Ingot production rate of the last several weeks has been from around 80 to 86 per cent of capacity.

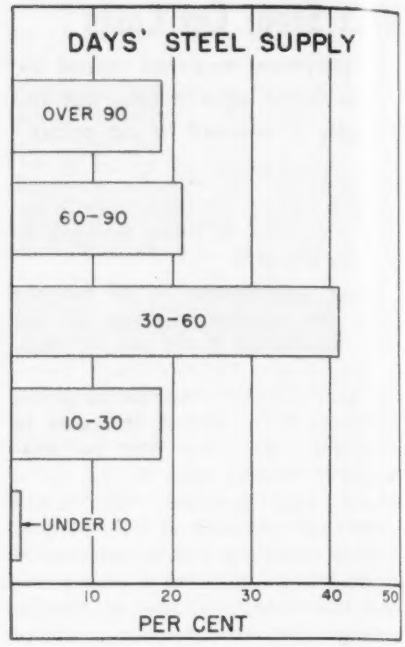
STEEL's survey shows that 41 per cent of the reporting consumers can operate from 30 to 60 days on steel now in stock, as is indicated in one of the accompanying charts. Twenty-one per cent can run 60 to 90 days, and 18.5 per cent could go over 90 days. Supply for only ten to 30 days is held by 18.5 per cent of the reporting plants. The remaining 1 per cent have less than a ten-day supply.

Automakers Well Stocked — The automotive industry, largest consumer of steel and most ardent participant in the recent protective buying against a steel strike, has taken in steel in such quantities that one Detroit steel salesman facetiously remarked: "I surely hope there is a steel strike now. My customers have so much material in stock I can't seem to sell them another pound."

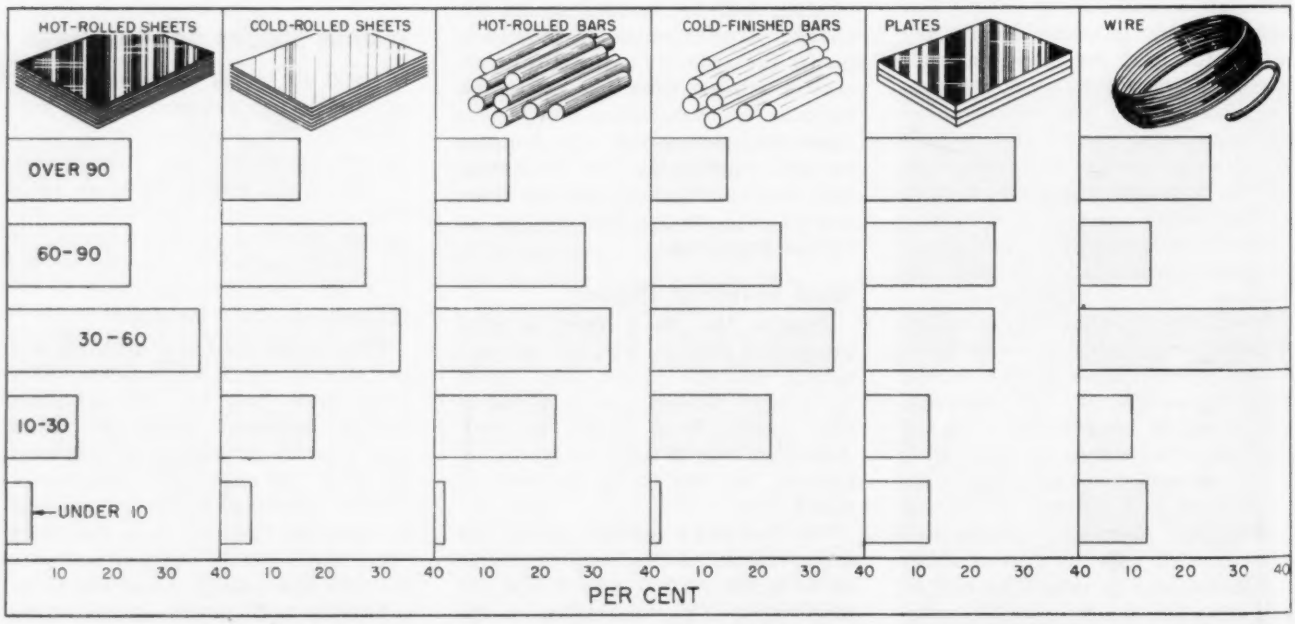
With automotive plant steel inventories generally above normal and with some tapering of automotive production expected for the fall months a decline in steel ordering by this industry appears likely. Two reasons are seen for a lowered output of passenger automobiles and trucks: First is the expected drop in retail demand usually experienced in late fall and winter, and second is the number of plant changeovers to 1950 models scheduled from now through January. While changeovers are effected now with little loss of production time they are accompanied by a slight dip in materials consumption.

Appliance Makers Buying—Experiencing a business upturn, some home appliance manufacturers have actively been in the market for steel in the last few weeks. A stovemaker said that if there is no strike it will continue to buy steel at maximum rate allowable under mill quotas, although another manufacturer of stoves considers that its inventories are on the plus side.

In contrast, other consumers are still engaged in inventory reduction. A large manufacturer of industrial equipment and a builder of locomotives, both of which have 45-day supplies of steel, have been reducing inventory for several weeks and planned to continue the reduction in absence of a steel trike. A shipbuilding and repair yard is paring down its inventories by selling tonnage to warehouses at the current



Consumers' Inventory Positions on Major Steel Products



DAYS' SUPPLY of major steel products held by metalworking companies reporting in STEEL's survey are shown here. The top color bar indicates percentage of consumers having more than a 90-day supply of a product. Next bar shows the percentage having a 60 to 90-day supply, and the middle bar is the percentage of consumers with a 30 to 60-day stock. Next bar represents the percentage of consumers with a 10 to 30-day inventory, while the bottom bar indicates metalworking companies holding less than a 10-day supply of steel products

mill price, and an agricultural implement manufacturer recently advertised bars, shapes and sheets at approximately mill levels. Even though some home appliance makers have stepped up operations one important producer which has been out of the steel market for some time doesn't expect to re-enter much before the end of the year. A structural fabricator who did no protective buying finds that a drop in his line of business leaves him with a steel inventory from 15 to 20 per cent above his 60-day normal.

Materials-wise, the principal limiting factors in production today are cold-rolled sheets and galvanized sheets. Metalworking companies' supply positions on six major steel products, as determined by STEEL's survey are shown in the chart on p. 46. It reveals that although some products, cold-rolled sheets for instance, have been in rather tight supply the inventories of them will last approximately as long as those of some of the more easily obtained products, such as cold-finished carbon bars. This reflects consumer efforts to hold inventories of the more readily obtained products in balance with materials in tight supply.

Ghost Orders Not Activated

RUMORS that the government soon would activate "phantom orders" for machine tools to aid employment in distressed areas are without foundation. This statement was made last week by L. D. McDonald, president, National Machine Tool Builders Association, and vice president, Warner & Swasey Co., Cleveland, in a letter to builders.

Mr. McDonald's statement was made after checking with various government departments concerned. He points out that activating the emergency orders would have little immediate effect on employment since it would take builders six to twelve months to build up operations. Such action now would aggravate the tool builders problem by increasing the government's stockpile of machine tools.

"A far more constructive step would be the removal of restrictions and obstructions that today discourage the purchase of productive equipment. For example, a liberalization of present tax policies of the Bureau of Internal Revenue with respect to depreciation allowed upon machine tools would, I believe, yield a backlog of orders that would stabilize employment in the industry and enable it to produce at a level guaranteeing the country adequate preparedness for national defense."

Boost to Business

Peaceful settlement in steel labor parley would promote resumption of forward planning

HOPES for a good level of business in the last quarter of this year are buoyed by prospects for labor peace in the steel industry.

Lengthy pending status in steel wage negotiations tended to freeze much of the forward planning in all industry and to postpone consumer goods buying by metalworking labor. A thaw is now expected which could have these results: Activation of deferred capital equipment orders; new equipment orders because of renewed business optimism; new equipment orders because of greater need for cost cutting; spurt in sales of all consumer goods.

More Consumer Goods—A modest increase in consumer product demand is already apparent. Auto sales are holding thus far this month although September traditionally is a poor sales period. New home construction is below last year's record level but still high. Demand for appliances, particularly refrigerators, is gaining. Capital equipment producers do not expect an immediate increase in orders, but by early 1950 the practical effects of labor stabilization and corollary factors may reach them.

Events happening now may be the forerunners of an expansion phase in the American economy (see STEEL, Sept. 12, p. 77). Business analysts point out that the U. S. postwar business history follows a three-stage cycle of immediate boom, shakeout, expansion. One of the major requisites for the third period is wage and price stability. This now appears possible for the first time since the end of the war.

Oliver To Boost Production

Production schedules for the first quarter of Oliver Corp.'s approaching new fiscal year are set at levels as high or higher than in the same period of the 1949 fiscal year in six of the seven cities where it operates plants. The new fiscal year begins Nov. 1.

Only plant where the company's production will be under last year's is at Cleveland, where Oliver turns out tracktype tractors, most of which go to industry rather than farms. Industrial business accounts for only 14 per cent of the company's sales volume.

Largest jump in production is scheduled for Shelbyville, Ill., where Oliver makes hay balers and cotton harvesters. The company plans to go into production in November on a new automatic baler which picks up hay, binds it with wire into square bales and conveys it to a wagon with no more manpower than that required to run a tractor.

Baldwin Gets Turbine Order

Baldwin Locomotive Works, Philadelphia, has an order from the city of Seattle to build the first three 140,000 hp hydraulic turbines for installation at Ross dam on the Skagit river. Contract value is approximately $2.6 million.

New Production Records Set

Alltime records in production and employment are being achieved by Nineteen Hundred Corp., St. Joseph, Mich., manufacturer of home laundry equipment.

The company is now manufacturing 28.4 per cent more washers, dryers and ironers than in October, 1948, previous manufacturing peak. Employment is at the highest level in the firm's 51-year history. This summer the company opened its new 286,000 sq ft plant adjacent to its previous manufacturing facilities.

First electric dryer ever produced by the company is in production now and a gas dryer is scheduled to start coming off assembly lines late in October.

Demand for the company's automatic washer has continued to increase since the early part of this year.

GE Plant Starts Rehiring

Rehiring of a substantial number of the 4000 employees it laid off last May was begun last week by General Electric Co.'s plant at Erie, Pa. Nearly all of the recalled workers are being returned to refrigerator lines. Pickup in refrigerator business is responsible for renewed production activity.

The company expects to continue rehiring workers in the next seven weeks, but it doesn't believe it can take back all of the 4000 laid off last May.

Prices Cut by Stove Maker

Price reductions of $10 to $20 have been made on several gas range models by Borg-Warner Corp.'s Norge Division, Detroit. The company also announced two new models.

Sales Brisk for TV Set Maker

Distributors' sales of the 1950 line of Motorola television receivers to dealers are "exceeding our highest hopes," says Paul V. Galvin, president,

Motorola Inc., Chicago. Initial sales of the new line are up 103 per cent over sales in the corresponding period of last year.

TV Set Allocations Continue

Allocation of Philco television sets for some time yet is anticipated, although production of the 1950 line is being increased in an effort to meet demand, the producer, Philco Corp., Philadelphia, reports.

Wysor Returns from Venezuela

RUFUS J. WYSOR, former president of Republic Steel Corp. and now iron ore consultant for U. S. Steel Corp., has returned from an inspection trip of the corporation's Venezuelan properties.

U. S. Steel is in the process of determining its iron ore policy of the future. Major question is: Make huge investments in beneficiation of Lake Superior taconites or obtain ore elsewhere in Venezuela or Labrador?

The employment of Mr. Wysor, now 64, on an independent consulting basis by U. S. Steel marks his return to the company where he had his first job. He began as a chemist with Carnegie Steel Corp., Pittsburgh, in 1906. In the interim he was a consulting chemist and metallurgist in New York; after a short period with the Panama Canal Commission he became associated with Bethlehem Steel Co. where he remained until 1925. In that year he went back to Pittsburgh as assistant general manager of Jones & Laughlin Steel Corp. He left the office of general manager in 1930 to go to Republic, where he stayed 15 years.

OTS Studies New Mineral

NEW mineral with wide range of possibilities for incorporation in commercial and industrial products is now under study and development, says Office of Technical Services, Department of Commerce.

Wollastonite, a mineral occurring in substantial deposits in New York state was quarried and beneficiated on pilot-plant scale under an OTS research project with the New York State College of Ceramics. Possible applications were investigated in welding-flux, abrasive-wheel materials, ceramics, chemicals, paints, paper, rubber and other products. Wollastonite's usefulness has already been demonstrated as a component for thermal insulation, agricultural liming, mineral wool and other materials. The report, PB 97826, "Wollastonite, An Industrial Mineral," is available from OTS, Washington 25, for $2.50 per copy.

Manganese from Low-Grade Ore

U. S. DEPENDENCE on Russia for manganese ore may be reduced by a new chemical discovery announced by Dr. Richard D. Hoak, senior fellow of Mellon Institute, Pittsburgh.

He told the regional conference of the American Institute of Chemical Engineers at Montreal that manganese can be economically recovered from low-grade ores. A concentrate containing upward of 60 per cent manganese can be recovered from 10 to 20 per cent ore, Dr. Hoak said. His method is a process involving treatment with waste acidic liquor, selective removal of sulphur and iron impurities and isolation of the manganese in the form of the oxide.

Steep Rock Boosts Ore Output

STEEP Rock Iron Mines Ltd., Steep Rock Lake, Ont., is increasing its output from 1.2 million to 4 million tons a year because of the strong demand for its low phosphorus, low silica ore.

Principal users of Steep Rock ore are Republic Steel Corp., Youngstown Sheet & Tube Co., Wheeling Steel Corp., Ford Motor Co. and Inland Steel Co.

Steel License Plates Return

STEEL license plates will be issued to automobile owners in Maryland next year, replacing the aluminum tags which were issued in 1947. The aluminum plates were issued under a "permanent tag" system and were kept up to date with insert tabs for each year.

When issued they were predicted to last at least five years, but Maryland Motor Vehicles Commissioner Brice says that thousands have worn out. Biggest reason for a new issue is that more than 30 per cent of the registration records are estimated to contain erroneous addresses of licensees.

Ingot Production Up

STEEL production reversed its trend last month, having increased for the first time since March, reports American Iron & Steel Institute, New York. August output of ingots and steel for castings was 6,710,820 net tons compared with a revised total of 5,779,120 tons in July. This was 10 per cent below the August, 1948, total of 7,446,834 tons and 12 per cent below the average monthly production of 7,654,224 tons in the first half of this year.

Steelmaking furnaces operated at an average of 82.2 per cent of capacity in August against 70.9 per cent in July, 96.3 per cent in the first six months, and 101.5 per cent in the first quarter.

Total steel output of 58,415,285 tons in the first eight months of 1949 was about 1 per cent above production in the like 1948 period, due to the industry's record high production in the first quarter.

Huge Open Hearth in Operation at Weirton

KING-SIZE open-hearth furnace, more than three times as large as the average unit, has begun operations at Weirton Steel Co., Weirton, W. Va.

The furnace is Weirton's No. 1 which has been rebuilt and enlarged from a former capacity of 200 tons to a new potential of 550. Late in August an entirely new open hearth of about the same capacity was tapped for the first time at Great Lakes Steel Corp., Detroit (see STEEL, Sept. 5, p. 54). Weirton and Great Lakes are divisions of National Steel Corp., Pittsburgh.

Enough Steel for 400 Cars—The raw steel produced by Weirton's new giant in a single heat is equal in weight to the total amount of steel in more than 400 automobiles. A single heat of the furnace also provides raw steel for enough tin plate to make 3.3 million No. 2 cans.

The open-hearth furnace is a rectangular structure 96.5 ft long; 29 ft, 3 in. wide at center; 24 ft 6 in. wide at the ends; 15 ft high from the hearth floor to the top of the furnace. The furnace contains more than 1000 tons of steel, and refractory materials in varying sizes equivalent to 1 million 9-in. bricks.

Weirton Tests Agglomerates

Weirton Steel Co. has started making blast furnace tests of agglomerates made up of fine iron ore and coal in the Disco process. The agglomerates are being made by Pittsburgh-Consolidation Coal Co. at its facilities near Imperial, Pa. Weirton Steel officials are expected gradually to step up the charge of these agglomerates and keep the test going through mid-October. About 7000 tons of agglomerates will be used.

Twofold results of these experiments are expected to be greater utilization of iron ore fines and reduction in the consumption of coke in the making of pig iron.

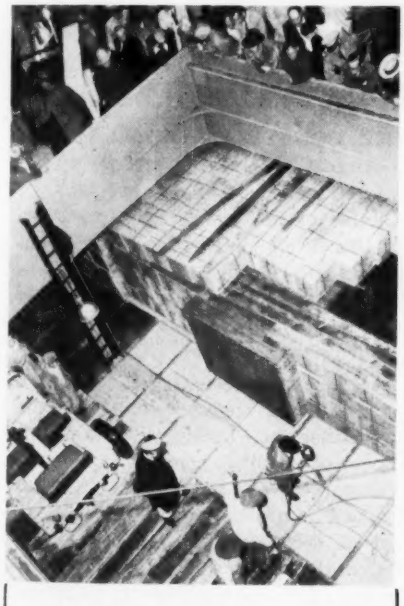
Europe Hopes for U. S. Investments

Promise given at dollar talks of more American capital for sterling area may prime the pump for increased flow to France, Belgium and Western Germany

INVESTMENT dollars for the sterling area may prime the pump for increased flow of U. S. capital to continental Europe. This is one reaction to the British-Canadian-American dollar talks expressed by French, Belgian and German businessmen.

Only a small portion of total ECA funds is being devoted to capital expansion. Of the $6,534,126,000 authorized for ERP nations as of Sept. 8, between 60 and 70 per cent is earmarked for food and agricultural items. The rest goes for industrial products, and only part of this can be classified as contributing to industrial expansion.

Latest steel expansion program in France is a project to build a new blooming mill at Rombas for $8.7 million, 15 per cent of which will be financed by ECA. Belgium's capital expansion is assisted by German dismantlings. Production will begin soon on several modern rolling mills from the former Hermann Goering steel plant. Reorganization of Western Germany's steel industry is in progress at last. This factor plus the conservative makeup of the new German government is expected to attract American capital.



SEA ROLL: A new rolling cargo deck for facilitating cargo handling is demonstrated at the Brooklyn Army Base to representatives of steamship and stevedore industries. After cargo is loaded on two movable steel platforms superimposed on the deck of the hold, they are rolled back into the wings simultaneously, thus saving time needed to carry each package to its assigned space. NEA photo

New French Blooming Mill

A new electric-powered blooming mill will be installed in France to replace two obsolete steam-driven units for Societe Lorraine des Acieries de Rombas, one of the member firms of the SOLLAC group. The facility will supply blooms and slabs for the new SOLLAC strip mill (for details on SOLLAC see STEEL, July 4, p. 40).

The modernization project will cost $8,709,000, including $1.3 million in ECA assistance funds, $2,709,000 in non-ECA funds and the remainder in francs with the dollar equivalent of $4.7 million. The new mill will produce as much as the two old units which were installed at Rombas prior to 1900 and have an annual capacity of about 770,000 net tons.

ECA has also authorized $3.2 million for purchase of American machine tools.

New restrictions on the use of electric power became effective Sept. 1 because the drought has cut output by 20 per cent.

Vacations cut steel production in July to 816,200 tons, compared with 843,700 tons in June. During the first half of the year 87,786 passenger cars and 53,872 trucks were produced, 44 per cent more than during the same period last year. The increase was due largely to high output of the 4-hp Renault. The 54,752 vehicles exported in the period went to Belgium, Luxemburg, Holland, Switzerland, Portugal, South Africa, Brazil and Sweden in that order.

Oil has been discovered in Alsace by engineers of Pechelbronn Co., a firm specializing in exploiting small deposits.

German Plants to Belgium

Dismantled German plants being set up in Belgium will broaden that country's steel product line in steel bars, concrete bars and wire rods. One mill of 200 mm gage, has been allotted to Thy-le-Chateau steelworks; another, of 325 mm gage, is going to Usines Boel; and a 400 mm rolling mill becomes the property of Usines Metallurgiques du Hainaut. All units were formerly in the Goering plant at Salzgitter.

ECA will assist in the financing of a new cement plant for Cimenteries et Briqueteries Reunies at Lixhe. The plant, to replace five obsolete facilities, will cost a total of $11 million; ECA supplies $1,535,000.

Ruhr Custodians Meet

German custodians, 12 in all, have convened at last to begin reorganization of the steel industry into several integrated companies. The Allies ordered this reorganization almost a year ago, but implementation has been delayed pending formation of a new West German government.

The custodians, working under the International Ruhr Authority, will: 1. Take control of all steel companies pending decision of the German government on the question of ownership. 2. work out proposals regarding reimbursement of the 30 independent and deconcentrated steel companies which were created two years ago under the Allied decartelization policy. (These independent companies will be bought by the future steel companies, about 12, to be created by the custodians.) 3. set up a new administrative body for the industry. 4. work out proposals regarding confiscation of the few steel plants which still are under control of the former steel companies.

Vereinigte Stahlwerke, once the German steel trust, is one of the old companies which still controls a few plants. Its units account for about 14 per cent of total production.

August steel output totaled 917,848 net tons, for a postwar record, compared with 874,028 tons in July. Germany seeks to raise its iron and steel export allotments from 330,000 tons annually to 715,000 tons.

Tito Credit Granted

Export-Import Bank of Washington has authorized credits of $20 million in favor of Yugoslavia for the purchase in the U. S. of essential materials and equipment. Much of the equipment will be for rehabilitation of nonferrous metal mines.

Israel Gets U. S. Loan

Export-Import Bank has authorized credits of $2,350,000 for Israel for purchase in the U. S. of port equipment and materials. The bank has now authorized a total of $53,350,000 in credits for Israel.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Bureau of Mines makes comprehensive report on cost of construction and operation of liquid synthetic fuel plants. Tonnages of steel plates and shapes published

USING Pittsburgh seam bituminous coal, cost of constructing a plant capable of producing 30,000 barrels of liquid synthetic fuel per day by coal hydrogenation would be $257,820,000; metal requirements would be 73,573 tons of steel plates and shapes, 53,921 tons of pumps, exchangers, compressors and other equipment, 39,400 tons of steel pipe, valves and fittings, 278 tons of aluminum and 3037 tons of copper.

These are some of the figures in a comprehensive report by Bureau of Mines in accordance with Public Law 290, 78th Congress, directing the bureau to furnish industry with basic information and cost data for development of a synthetic liquid fuels industry.

Experimental and demonstration work has reached the stage where, the report states, "unlimited quantities of premium motor gasoline now could be produced from coal at a cost that would increase the current service station price to the consumer by only 3 to 4 cents a gallon. Through the sale of by-product phenols, for which demand may be limited, a few initial plants could produce gasoline at even lower cost.

"The versatility of the coal hydrogenation process is well established by the variety of products made—motor and aviation gasoline, diesel and jet fuels, fuel oil, and even wax and lubricating oils. Very satisfactory performance is anticipated with high-volatile American coals which are available in huge quantities in many parts of the country."

The 83-page report contains cost of construction and operation for plants designed to use fuels of Pennsylvania, Wyoming, Illinois, Montana and North Dakota. Its title is "Report of Investigations 4564." Free copies may be had by writing to the Bureau of Mines, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13.

Task Force To Spot Chiselers

TAX EVASION will be rendered much more difficult by action of Congress in appropriating more money for use by Treasury's Bureau of Internal Revenue in hiring additional employees. Starting immediately, the bureau is to add upwards of 4000 tax experts to its staff in the present fiscal year; all of them will be stationed in field offices—none in Washington. Their task will be to check tax returns to spot chiselers.

Air Force Plans Denied

AIR FORCE has no intention of requesting West Coast aircraft manufacturers to move their plants to inland locations and has no authority to make such requests.

This statement was made to STEEL in correction of erroneous reports that Secretary W. Stuart Symington's recent visit to the Boeing Aircraft Co. in Seattle was the first move toward that objective. What the Air Force is seeking to encourage is dispersion, not overnight, but over a period, a spokesman told STEEL, and in this respect the locations of most Coast plants is satisfactory: Plants in the Los Angeles area are "reasonably well dispersed over several hundred square miles, and they would not be made less vulnerable to attack simply by moving them inland."

Location of the government-owned B-36 plant at Fort Worth and the B-47 stratojet plant at Wichita, Kans., this spokesman stated, do not indicate a policy of building plants only on inland sites as has been mistakenly reported but, rather, is in line with the policy of dispersion. "This is nothing new," he explained; "contracts for the Fort Worth plant were let while we were fighting as allies of the Russians, and those for the Wichita plant were signed in 1947."

Curb on Influence Peddlers

SEEKING to eliminate so-called "five percenters" or "influence peddlers" as intermediaries between government procurement agencies and contractors, Jess Larson, General Services administrator, has effected an agreement under which all the procurement agencies have adopted a "Covenant Against Contingent Fees." It will be inserted in all contracts and signed by contractors. It reads:

"The contractor warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees, or bona fide established commercial or selling agencies maintained by the contractor for the purpose of securing business. For breach or violation of this warranty the government shall have the right to annul this contract without liability or in its discretion to deduct from the contract price or consideration the full amount of such commission, percentage, brokerage, or contingent fee."

Implementing regulations are being drawn up and will be sent to all procurement offices throughout the country so that the covenant may be in new contracts about Oct. 15.

AT&T Patent Licensing Available

AMERICAN Telephone and Telegraph Co. has made all its U. S. patents available for licensing; it required 16 pages in the patent register in the Patent Office's Official Gazette for Sept. 13 to list them. Inquiries regarding licenses should be addressed to Patent Licensing Division, Western Electric Co. Inc., 195 Broadway, New York 7.

August Building: $1.9 Billion

NEW CONSTRUCTION put in place in August was valued at $1.9 billion, Commerce Department reports.

Value of new construction in August, based on joint estimates of Commerce and Labor departments, was 3 per cent above the revised July total but 2 per cent under the total for August last year.

All types of construction advanced seasonally in August except private nonresidential building and some types of utility construction, says Commerce's Construction Division. Private nonfarm homebuilding, valued at $660 million, was 2 per cent above the revised estimate of $650 million for July. Private nonresidential building was off 2 per cent as a result of continued declines in industrial and commercial building.

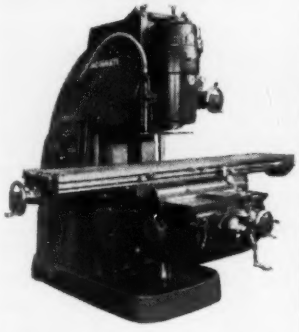
Construction of privately owned electric and gas utilities increased further, but new construction expenditures by railroads and by telephone and telegraph companies tapered off. An advance of 4 per cent in total public expenditures for new construction to $566 million in August resulted primarily from a seasonal increase in highway work.

Reasons for an 8 per cent decline

Click, Click, Click ... and there's the Speed and Feed you want

POWER SELECTED WITH ONE LEVER

It's almost as easy to do as to talk about it. That's why operators really like the High Power and Dual Power Dial Types. They're big, rugged, take heavy cuts (up to 50 hp for the largest sizes), yet they're exceptionally convenient and easy to run. This one Cincinnati feature of power speed and feed selection, at the *front and rear working stations*, goes a long way toward reducing milling costs. Efficient cutting becomes a habit with the Dial Type operator because it's so easy to select the right combination of speeds and feeds. There are other features, too, of interest to both shopmen and management. You will find them outlined in two attractive catalogs: Nos. 3, 4, 5 and 6 High Power Dial Types, M-1644. Nos. 3, 4, 5 and 6 Dual Power Dial Types, M-1647.



Left: The speed dial can be rotated in either direction. It is equipped with a built-in milling speed calculator for determining the correct cutting speed and cutter rpm.

Right: The feed dial can be rotated in either direction. Shown with its cover removed, the feed dial is provided with two sets of figures, one visible when working at the front of the machine, the other visible when working at the rear.

Single lever at the front working position for selecting speeds and feeds throughout their complete range of 100 to 1 and 240 to 1 respectively. Note "INCREASE" and "DECREASE" positions for rotating the speed and feed dials in either direction. This feature invites maximum cutting efficiency.

High Power and Dual Power Dial Type Milling Machines have labor-aiding power speed and feed change. Built in Nos. 3, 4, 5 and 6 sizes; plain and vertical styles; Nos. 3, 4 and 5 in universal style. Catalog M-1644 for High Power Dial Types; M-1647 for Dual Power Dial Types.

CINCINNATI

THE CINCINNATI MILLING MACHINE CO.

CINCINNATI 9, OHIO, U. S. A.

MILLING MACHINES • BROACHING MACHINES • CUTTER SHARPENING MACHINES
FLAME HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

in private construction in August as compared with the same month last year were an 8 per cent drop in homebuilding and a 20 per cent decline in nonresidential building.

Construction by privately owned electric and gas utilities was 10 per cent above last year's levels; telephone and telegraph companies had reduced their construction by 13 per cent.

Public expenditures for new construction in August were 18 per cent larger than in the same month last year. School and hospital building continued at high levels as did reclamation, river, harbor and flood control work.

Summary for the first eight months of 1949 shows almost $12.2 billion for value of new construction put in place. This is 2 per cent more than the like period of 1948. This slight margin was gained in the first quarter. The second quarter total was about the same as last year. Revised estimates placed the July total below the level of a year ago—a trend that was continued in August. Value of private construction put in place was 6 per cent less than last year; public construction was up 30 per cent.

FTC Dismisses Action

FEDERAL TRADE Commission has dismissed the Metal Lath Manufacturers Association as a respondent in the commission's action against the metal lath industry. Charges against the metal lath manufacturers continue in force. "Respondent manufacturers," the commission says, "followed a common pricing system including zone pricing, and issued substantially identical price lists, and from time to time made identical and simultaneous price changes upward in the presence of decreasing prices on sheet metal." The prosecution closed its case earlier this year and the respondents now are to start putting in their defense.

Lustron Loan Chances Good

NEW LOAN application of the Lustron Corp. for $14.5 million—bringing its total indebtedness to the Reconstruction Finance Corp. to $52 million—is being considered and stands a good chance of approval.

RFC is making a thorough investigation and has men at the plant at Columbus, O., to make a thorough study of the company's activities. Investigation of Lustron's affairs also is contemplated by the housing subcommittee of the Senate Banking and Currency Committee. Sen. John J. Sparkman (Dem., Ala.), chairman, is thinking of taking the subcommittee to Columbus to inspect the company and to hold hearings that would bring out its activities in detail.

If loans beyond the $52 million involved in existing pending application are required—as RFC expects—action by Congress will be necessary: RFC will have only $3.5 million left for working capital loans to housing prefabricators if the $14.5 million application is granted. Proposals to appropriate an additional $50 million for working capital assistance to prefabricators and $75 million to finance distribution of prefabricated houses have not been legislated as yet.

As previously reported in STEEL, the 10-year $34 million loan to Lone Star Steel Co., Daingerfield, Texas, for investment in steel plant equipment, was conditioned on Lone Star's raising of $26 million of private capital. This figure, it is learned, included $22 million to be invested in plant equipment "for the conversion of pig iron into steel plate" and $4 million working capital.

RFC loans in July included $1 million to Glenn L. Martin Co., Baltimore, for debt payment; $700,000 to Service Caster & Truck Corp., Albion, Mich., for working capital; and $4 million to McLouth Steel Corp., Detroit, for plant construction. The McLouth loan is for 9 years and 4 months and brings McLouth's indebtedness to the RFC to $14.5 million.

Rice Storage Capacity Is Short

AFTER study of the rice situation in Texas, Agriculture Department's Production and Marketing Administration finds that there is a big shortage of public bulk rice storage capacity. The state has storage capacity of 5,975,700 barrels of rough rice, but the portion available to the public has a capacity of 686,000 barrels of which only 492,000 are available to the average producer. The shortage in capacity is estimated at about 2 million barrels on the basis of present rice production.

Export-Import Gap Shrinking

FIRST-HALF statistics show that U. S. exports are somewhat less predominant in our trade with Latin American countries and that the gap between these exports and our imports from Latin America slowly is shrinking. This trend is expected to be more noticeable in the second half due to increasing Latin American restrictions agains the goods of hard-currency countries like the United States.

Exports in January-June, 1949, to Latin America from the U. S. were $1.5 billion, compared with $1.7 billion in the first half of 1948, and $2 billion in the first half of 1947. Our imports from Latin America in the first half of 1949 were $1,174,000,000, compared with $1.2 billion in the first half of 1948, and $1 billion in the first half of 1947.

AEC Publication Work Party

CONTEMPLATING release of more technological and scientific information about nuclear energy, the Atomic Energy Commission is preparing to set up a working party to examine the commission's literature on metallurgy.

Task is to be performed by a group of representatives of professional societies and the business press, properly cleared under the security requirements. The group will decide what reports and other documents might be publicized with beneficial results to American industry. The commission will decide, after weighing the advantages gained from such publicity and the disadvantages of releasing information to rival nations, which material should be declassified for release. An angle also under watch is how to publicize information which may be declassified in technological and business publications and in other ways.

If the test program works out to the commission's satisfaction, similar programs will be considered for releasing other types of information so a much larger portion of the commission's information can be put to general use.

Material to be reviewed by the working party will be on design, construction and possible applications of pumps, valves, blowers and instruments, and the metallic materials used in construction of chemical, mechanical, electrical and electronic equipment and instruments. The working party is expected to start about Dec. 1 and submit its report and recommendations to the commission early in 1950.

MB, Industrialists Meet

FIRST fall meeting of industrialists to be scheduled by the Munitions Board was with the Aluminum and Magnesium Industry Advisory Committee at the Pentagon Sept. 14.

Cost Reduction

By instrumentation was theme of Fourth National Instrument Conference and Exhibit

"INSTRUMENTATION reduces costs" was the keynote of the exhibit and program papers offered at the Fourth National Instrument Conference and Exhibit, sponsored by the Instrument Society of America in Municipal Auditorium, St. Louis, last week.

Society met jointly with the Industrial Instruments & Regulators Division of American Society of Mechanical Engineers, American Institute of Physics, Instruments & Measurements Committee of the American Institute of Electrical Engineers, the Institute of Radio Engineers, the National Telemetering Forum and the Scientific Apparatus Makers' Association.

Value of equipment displayed by 141 exhibitors in 196 individual booths topped $6 million; 19,640 sq ft of display space, including 1410 sq ft for government exhibits, was sold.

Dozens of firms well-known to the metalworking industry placed new instruments on exhibit for the first time.

Although the National Instrument Conference and Exhibit is a postwar fledgling (official date of its organization was Jan. 10, 1946), an estimated 9000 engineers, executives and technical men took time to see the automatic controls which "can see more, hear more, think faster and toil more tirelessly than human beings."

Help Cut Costs—Carl Kayan, outgoing president of the society, pointed out: "Costs must be cut so that prices may be reduced without wiping out profits. High wages must be kept high. To meet these demands, industry is planning increased output per worker."

"Modern industry depends on automatic controls, which are more accurate and more dependable than human beings. More and more, the tedious tasks of industry are being performed by instruments while skilled men install and maintain them."

Mechanized trend is slowed by a shortage of instrument men at present. The instrument industry cuts horizontally across all other industries and through public health and educational institutions. It is geared so closely to our economy that the amount of planned capital expansion for a given period can be determined by the ratio of orders placed for instruments.

Pigott Heads Society — R. J. S. Pigott, chief engineer, Gulf Research & Development Co., was elected president of the Instrument Society at a meeting of the board of directors. He is responsible for such developments as the marsh buggy for geophysical exploration and a new device for measuring wall pressure of piston rings. New vice president is Nelson Gildersleeve, section leader of Electrical Instrument Division of General Electric Co., Lynn, Mass. Former treasurer, H. Ferguson, and former secretary, Richard Rimbach, were re-elected.

R. J. S. PIGOTT

Packaging Competition Slated

JUDGES have been selected for the five classifications entered in the National Protective Packaging Competition being conducted in conjunction with the Fourth Annual Industrial Packaging & Material Handling Exposition to be held at Detroit's Convention Hall, Oct. 4—6. Competition is sponsored by Society of Industrial Packaging & Materials Handling Engineers, Chicago, and is open to any manufacturer using protective packaging or any organization producing such units.

Prizes for Enameling Papers

FERRO ENAMEL Corp., Cleveland, will award five prizes totaling $1000 for the best papers written by graduate and undergraduate students in U. S. and Canadian ceramic and ceramic engineering schools on any phase of technology related to porcelain enameling of metal. Awards will be made at the meeting of the American Ceramic Society in New York next April.

Judges for the contest are: Charles S. Pearce, secretary, American Ceramic Society; Edward Mackasek, managing director, Porcelain Enamel Institute Inc.; and Dr. G. H. McIntyre, vice president and director of research, Ferro Enamel Corp.

CALENDAR OF MEETINGS

Sept. 21-24, National Association of Foremen: 26th convention, Hotel Statler and Masonic Temple, Detroit. Association headquarters are at 321 W. First St., Dayton, O.

Sept. 22, National Industrial Conference Board: First meeting of 34th year at Waldorf-Astoria Hotel, New York. Association headquarters are at 247 Park Ave., New York.

Sept. 23, Malleable Founders' Society: General meeting, Hotel Cleveland, Cleveland. Society headquarters are in the Union Commerce Bldg., Cleveland.

Sept. 25-28, Controllers Institute of America: 18th annual meeting, San Francisco. Institute headquarters are at 1 E. 42nd St., New York.

Sept. 25-Oct. 1, American Institute of Mining & Metallurgical Engineers: Midyear meeting, Neil House, Columbus, O. Details may be obtained from J. H. Melvin, Orton Hall, Ohio State University, Columbus, O.

Sept. 26-28, National Electronics Conference: 1949 conference and exhibit sponsored by Illinois Institute of Technology, Edgewater Beach Hotel, Chicago.

Sept. 26-28, American Mining Congress: Metal Mining Convention, Spokane, Wash. Congress headquarters are in the Ring Bldg., Washington.

Sept. 26-28, American Management Association: Personnel conference, Waldorf-Astoria Hotel, New York. Association headquarters are at 330 W. 42nd St., New York.

Sept. 26-28, American Mining Congress: Metal Mining Convention, Spokane, Wash. Congress headquarters are in the Ring Bldg., Washington.

Sept. 27-30, American Society of Mechanical Engineers: Fall meeting, Hotel Lawrence, Erie, Pa. Society headquarters are at 29 W. 39th St., New York.

Sept. 29, American Iron & Steel Institute: Regional technical meeting, Hotel Statler, Buffalo.

Oct. 3-4, National Association of Corrosion Engineers: South central regional meeting, Adolphus Hotel, Dallas. Heading the arrangement committee is G. R. Olson, United Gas Pipe Line Co., Shreveport, La.

Oct. 3-5, American Coke & Coal Chemicals Institute: Annual meeting, Skytop Lodge, Skytop, Pa. Institute headquarters are at 129 15th St. N.W., Washington.

Oct. 3-6, Association of Iron & Steel Engineers: Annual convention, William Penn Hotel, Pittsburgh. Association headquarters are at 1010 Empire Bldg., Pittsburgh.

Oct. 4-6, Society of Industrial Packaging & Materials Handling Engineers: Fourth annual exposition, Detroit.

Oct. 6, American Iron & Steel Institute: Regional technical meeting, Drake Hotel, Chicago.

Oct. 10-14, American Society for Testing Materials: First Pacific area national meeting, Fairmont Hotel, San Francisco. National headquarters are at 1916 Race St., Philadelphia.

Oct. 10-11, Boston Conference on Distribution: 21st annual affair, sponsored by Boston Chamber of Commerce, Harvard University, Boston University and others.

Oct. 10-13, Purchasing Agents Association of Baltimore: Annual manufacturers' products exhibits, Lord Baltimore Hotel, Baltimore. Chairman of the management committee is Stephen J. Buschman, Stark Electric Co., 1300 S. Short St., Baltimore.

New Finished Ste

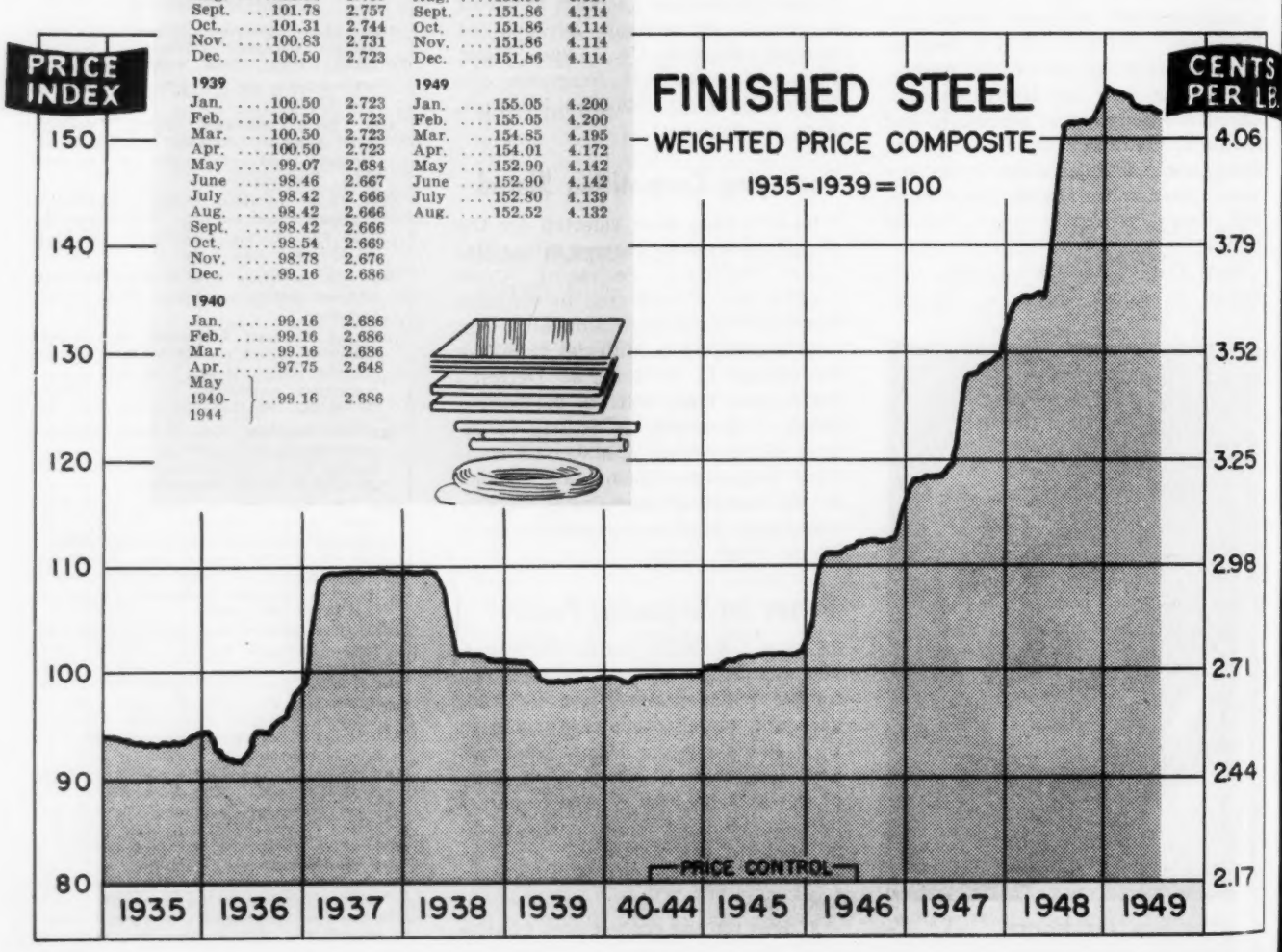
STEEL begins publication in this issue of a weighted index of finished steel prices based on valid statistical and economic premises. The technical methods used in computing the index result in a series of relatives which more accurately reflect changes in the composite of 14 classifications of steel products than did the composites previously published.

The index numbers, listed in the accompanying table, are percentages of the average for the base period, 1935-1939. This index for the latest period, 152.52 reveals, for instance, that finished steel prices are 52.52 per cent higher than they were in the base period.

Based on 1935-1939 — The five year period, 1935 through 1939, is taken as a base for several reasons. Government and industry economists consider that period as having been in a state of economic balance. Deliveries of goods were made within normal periods; no extreme shortages or surpluses were experienced; prices were fairly stable; the period covered a short

FINISHED STEEL WEIGHTED PRICE COMPOSITE

1935	Index	Cents per pound	1945	Index	Cents per pound
Jan.	93.93	2.545	Jan.	100.32	2.718
Feb.	93.93	2.545	Feb.	100.65	2.727
Mar.	93.93	2.545	Mar.	100.65	2.727
Apr.	93.80	2.541	Apr.	100.65	2.727
May	93.80	2.541	May	101.10	2.739
June	93.80	2.541	June	101.78	2.757
July	93.80	2.541	July	101.78	2.757
Aug.	93.73	2.539	Aug.	101.85	2.759
Sept.	93.87	2.543	Sept.	101.87	2.760
Oct.	93.87	2.543	Oct.	101.87	2.760
Nov.	93.87	2.543	Nov.	101.87	2.760
Dec.	94.00	2.546	Dec.	101.87	2.760
1936			**1946**		
Jan.	94.00	2.546	Jan.	101.87	2.760
Feb.	94.00	2.546	Feb.	106.82	2.894
Mar.	92.03	2.493	Mar.	111.62	3.024
Apr.	91.62	2.482	Apr.	111.62	3.024
May	91.62	2.482	May	111.62	3.024
June	91.62	2.482	June	111.86	3.030
July	94.09	2.549	July	112.04	3.035
Aug.	94.09	2.549	Aug.	112.04	3.035
Sept.	93.96	2.545	Sept.	112.04	3.035
Oct.	94.78	2.568	Oct.	112.04	3.035
Nov.	94.87	2.570	Nov.	112.04	3.035
Dec.	96.94	2.626	Dec.	112.82	3.056
1937			**1947**		
Jan.	98.44	2.667	Jan.	117.90	3.194
Feb.	98.49	2.668	Feb.	118.67	3.215
Mar.	108.25	2.932	Mar.	118.67	3.215
Apr.	109.60	2.969	Apr.	118.67	3.215
May	109.94	2.978	May	118.67	3.215
June	109.94	2.978	June	118.67	3.215
July	109.94	2.978	July	120.39	3.261
Aug.	109.94	2.978	Aug.	128.96	3.494
Sept.	109.94	2.978	Sept.	128.96	3.494
Oct.	109.94	2.978	Oct.	128.96	3.494
Nov.	109.94	2.978	Nov.	129.28	3.502
Dec.	109.94	2.978	Dec.	129.28	3.502
1938			**1948**		
Jan.	109.94	2.978	Jan.	132.93	3.601
Feb.	109.73	2.973	Feb.	134.56	3.645
Mar.	109.65	2.970	Mar.	135.91	3.682
Apr.	109.65	2.970	Apr.	135.91	3.682
May	109.65	2.970	May	135.02	3.658
June	107.84	2.921	June	134.56	3.645
July	101.84	2.759	July	143.08	3.876
Aug.	101.84	2.759	Aug.	151.99	4.117
Sept.	101.78	2.757	Sept.	151.86	4.114
Oct.	101.31	2.744	Oct.	151.86	4.114
Nov.	100.83	2.731	Nov.	151.86	4.114
Dec.	100.50	2.723	Dec.	151.86	4.114
1939			**1949**		
Jan.	100.50	2.723	Jan.	155.05	4.200
Feb.	100.50	2.723	Feb.	155.05	4.200
Mar.	100.50	2.723	Mar.	154.85	4.195
Apr.	100.50	2.723	Apr.	154.01	4.172
May	99.07	2.684	May	152.90	4.142
June	98.46	2.667	June	152.90	4.142
July	98.42	2.666	July	152.80	4.139
Aug.	98.42	2.666	Aug.	152.52	4.132
Sept.	98.42	2.666			
Oct.	98.54	2.669			
Nov.	98.78	2.676			
Dec.	99.16	2.686			
1940					
Jan.	99.16	2.686			
Feb.	99.16	2.686			
Mar.	99.16	2.686			
Apr.	97.75	2.648			
May 1940-1944	99.16	2.686			



Steel Price Composite and Quoting Method

"boom" as well as a slight "depression." This same period is taken as base by the Federal Reserve Board in its index of industrial production. The Bureau of Labor Statistics and other government agencies also use this period as base for computing many of their indexes.

Fourteen Products Included—The 14 product classifications used in computing the finished steel price index (structural shapes, plates, rails, hot-rolled and cold-finished carbon bars, hot and cold-rolled carbon sheet, galvanized sheet, hot and cold-rolled carbon strip, standard pipe, wire, nails, tin plate) cover about 80 per cent of the total tonnage produced by the industry.

Since the index aims to show the trend and at the same time provide a measure of price fluctuation, independent of other variable factors, the "weighting" given each product classification is held constant. Product weights are based on average tonnages produced for sale in the base period as reported by the American Iron & Steel Institute, New York. The base quantities (weights) converted to a percentage basis are: Hot-rolled carbon bars, 12.87519; plates, 11.88400; pipe, 11.33423; hot-rolled sheets, 9.93547; tin plate, 9.10459; structurals, 8.87895; cold-rolled sheets, 7.92402; hot-rolled strip, 6.86266; galvanized sheets, 4.88860; wire, 4.80721; rails, 4.16611; cold-rolled strip, 2.71384; cold-finished bars, 2.24145; nails and staples, 2.28368.

Pittsburgh Prices Used—In selecting a price basis, Pittsburgh district quotations were chosen since they are available for all products and for the entire period covered. The fluctuations in prices at this point closely parallel those in all other producing centers. In many instances, in fact, Pittsburgh changes have governed price movements elsewhere.

It is important to note that the index covers only base prices. The extremely important factor of "extras" is unavoidably omitted from the calculations since no arbitrary uniform application of extras can be representative for the entire production of any single product. However, changes in extras have a pronounced effect on the cost of finished steel to consumers. The value of the "cents per pound" equivalents, therefore, is greatly lessened; the figures are useful in making comparisons with prices on various dates but they cannot be used as a measure of the actual cost of steel to consumers.

The Formula—The formula used in computing the index is known as the Laspeyres' formula and is expressed algebraically as:

$$\frac{\Sigma\ p_1\ q_0}{\Sigma\ p_0\ q_0}$$

where Σ = sum of; p_1 = price of commodity at time "1"; q_0 = average quantity of same commodity produced in base period; p_0 = average price of same commodity in the base period. More simply stated, the index is the sum of the values of a given period divided by the sum of the values of the base period, value being equal to the base period quantity times the given period or base period price, respectively.

New Price Reporting Service

A NEW PRICE REPORTING service is inaugurated in this issue. Henceforth, STEEL will quote prices of nearly 150 producers of finished and semifinished steel products in more than 125 classifications. Not only will closing prices be listed, but also the producers and the location of the producing mill.

This is a service to steel buyers never before offered by any magazine.

Suppose you want to buy cold-rolled sheets. STEEL's new market service will show you:

1. The price per pound at the 18 producing points in the country.
2. The 20 companies selling cold-rolled sheets at those points.
3. The prices they are quoting.

In one concise package you have complete information on the basic steel products: Which mills sell what products, what their prices are, and where they are located. Compare prices and freight rates to determine where you can buy most advantageously.

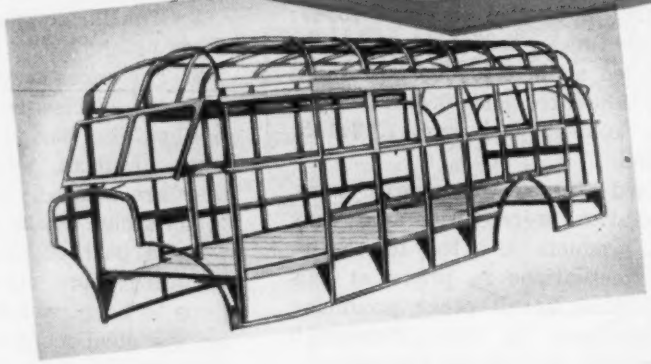
As a part of this new market service, STEEL is initiating more vigorous reporting of market situations to keep readers informed on trends in the market for steel, nonferrous metals and other materials, changes in extras, deviations from quoted prices and other information which the steel buyer needs to know.

The market developments each week will be summed up in STEEL's Market Summary, as they have in the past. This roundup of the situation in the steel and metalworking industries is followed eagerly by readers, is quoted widely by newspapers throughout the country each Monday.

PRICE QUOTATIONS START ON PAGE 128

FRAMED and COVERED with safety

Pictures courtesy of Oneida Products Corp.



The greater strength and toughness of N-A-X HIGH-TENSILE steel permits weight savings of up to 25% in section—and still affords maximum protection against injuries from traffic accidents.

Its superior fatigue-resistance and excellent weldability prolongs this safety-factor . . . reduces maintenance costs over more miles and under all conditions.

If you manufacture a product requiring high strength, toughness and good weldability, it will pay you to investigate N-A-X HIGH-TENSILE.

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By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

New small car, spectacular and completely different from anything yet developed in automotive design, mocked up for Kaiser-Frazer

DETROIT

MOCKUPS for a new small car have been made by a leading body builder for Kaiser-Frazer. Those who have seen them say the lines are spectacular and completely different from anything that has yet been developed in automotive design. Placing the job in production is something else again, and whether K-F will ever do so remains a question, because of several million dollars which would be involved in tooling. One report says the Bank of America has offered to advance the company around $30 million for the project if the car would be on the market by next spring. That is a pretty tough assignment: the requisite tooling would call for a considerable period of time.

Many are of the opinion the only way K-F can get back in the black is by the introduction of a smaller and less expensive car. An effort in this direction was the recent utility model which proved popular and came in for a large share of assembly schedules. It was priced lower than regular sedan models and, with the full opening rear section, offered load-carrying facilities which set it apart from conventional body designs. Last month, production was something over 5100 cars. About 35 per cent were utility models. Currently, schedules are running about 350 daily.

The Willow Run producer is facing some real tough going, after enjoying a postwar flush of business which was little short of amazing. The steps which were taken to insure supplies of steel and pig iron reflect a spirit and drive matched by few sections of industry. Now that the difficulties involved in obtaining materials are past, K-F has dispensed with the various extracurricular efforts it had to make in this direction and can realize cost savings by buying through conventional channels.

The problem K-F now faces is in trying to sell a car which does not have the benefit of a long-established name and which offers no important features in design or construction which set it apart from competing makes. When automobiles were hard to get, sales were easy, but now that the buyer can obtain just about anything he chooses, a newcomer to the industry has to fight hard for business. And in the fighting it becomes necessary to cut out all the frills in the production organization. High-priced administrative and production talent must go by the boards in the race to keep operations in the black. More than one official who joined K-F back in 1945 at a salary three or four times what he had been earning is now dreaming fondly of the good old days and wondering where he can get another job.

Truck Sales Continue To Lag

PRODUCTION of trucks and commercial cars throughout the industry continues to falter. Prospects point to a further decline in business. For some months, sales of heavier types of trucks have been weak and they are showing little improvement although the recent upturn in construction and roadbuilding is calling for a few new purchases. Bulk of truck sales are in the light-weight models and pickup vehicles. Competition is keen among producers of these commercial vehicles and new models are being introduced regularly to stimulate sales. International Harvester is currently retooling for new models and should be in production by the middle of next month.

Manufacturers producing passenger cars and trucks—General Motors, Dodge, Ford, Studebaker—have been able to exert a little more pressure on their dealers to move commercial vehicles, by offering the inducement of extra allotments of passenger cars. In many cases, dealers sold trucks at a loss just to obtain more passenger cars, but even this can be carried only so far since the truck market is approaching a saturation point.

Truck builders without light models are finding slim pickings and are looking to the military and government field. Some are negotiating for RFC loans; others already have received financial assistance from this source. They are watching the possibility of obtaining contracts from the large appropriations for foreign aid and defense programs which the government is now authorizing.

NIGHT LIFE: Streaks of light (background, left) make a photographic record of new Chevrolets being driven into a lot to await shipment with hundreds of others. Last month, with night shifts added to several plants, Chevrolet set an all time production record of 163,346 passenger cars and trucks

Buick Output Hits New Peak

BUICK production for August hit a new alltime peak of 40,106, tops for any month in the division's 46-year history. The previous record was 38,913, set in March of 1941. With the impetus of the record-breaking August output, production for 1949 to date is 274,233, only about 42,000 short of the full year for 1941. Included in August production were 20,000 of the special models which are now accounting for well over 50 per cent of total assemblies.

Strong sales emphasis is being placed on the special series because of its lower price tag. It is considered likely that this model soon may be as much as 75 per cent of all assemblies at Flint. Apparently, public reception has been favorable, although considerable discussion is heard throughout the industry over whether the model may have been trimmed down too much from previous Buick standards. But, it does reflect the trend in the industry to-

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ward lower-cost models with the fancy trimming removed.

Chevrolet Over Million Mark

CHEVROLET has passed the million mark in 1949 production, with the August total of 163,346 setting an alltime high. Weekly schedules currently are better than 26,000 passenger cars and 7000 trucks and commercial vehicles. Chevrolet's automatic transmission is now in production at the division's Cleveland plant, several thousand having been assembled already. Public introduction of the unit is not expected before January, but apparently it is figured that the demand will be heavy, so a large bank is being built up in advance. Price of the transmission reportedly will be around $100, making it the lowest-cost automatic drive of the market.

Suggestions Worth $200,000

MORE THAN 4000 Ford employees have earned nearly $200,000 in the past two years for suggestions to improve health, safety, working conditions and manufacturing operations. Seven have earned $1500 each. Average payments have been $48.05. The suggestion system was instituted at the Detroit plant of Lincoln-Mercury and in the Ford steel division in 1947. Since then it has been extended to 61 plant units and parts depots, 16 of them in the Rouge plant alone. On Sept. 1 it was started at the company's Iron Mountain plant. Before the yearend it will be instituted at the Mound road plant in Detroit and at the Canton, O., plant, making the plan company-wide.

Since Aug. 1, 1947, 23,810 suggestions were received and of these 5974 were adopted and 4049 awards made. Another 1925 awards will be made as soon as the amount to be paid can be determined. Number of participating employees is above the national average for all industries and the average award has been $28.67 above the national average for such plans.

This is the plan: A "suggestion investigator" talks with each employee the day after his suggestion has been submitted and often finds he can help the employee develop the idea further. If he discovers the suggestion has not been defined clearly, he helps the employee rewrite the idea. The suggestion then is submitted to a committee which studies it and either accepts or rejects the idea. After that, the man submitting the proposal is notified personally by the investigator. If the idea is rejected the reasons are explained carefully. After a suggestion has been accepted, it is tried out for two months and following this an award based on the percentage of annual savings is made.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1949	1948
January	445,092	422,236
February	443,734	399,471
March	543,711	519,154
April	569,728	462,323
May	508,101	359,996
June	623,689	454,401
Six mos.	3,134,055	2,617,581
July	604,351	489,736
August	675,000*	478,186
September		437,181
October		516,814
November		495,488
December		514,337
12 mos.		5,549,323

*Preliminary.

Estimate for week ended:

	1949	(Same week) 1948
Aug. 27	155,367	100,699
Sept. 3	146,039	101,879
Sept. 10	124,043	78,677
Sept. 17	148,000	94,410

Estimates by Ward's Automotive Reports

43.5 Million Cars on Road

BY YEAREND it is estimated there will be about 43.5 million motor vehicles on the highways, including 35.4 million passenger cars, 7.9 million trucks and over 200,000 busses. That is 2.5 million more than were registered last year, and nearly 8.7 million more than in 1941. At this rate of increase, there could easily be 50 million cars and trucks registered within the next three years.

Big Supply Force Needed

A TYPICAL medium-sized automobile manufacturing company buys from 7300 vendors which supply an estimated 70,000 different items. Larger companies may buy from as many as 25,000 suppliers. Ford has added 45 major new suppliers in California alone in the past two years and spends approximately $47 million a year with these companies for batteries, tires, machined parts, forgings, stampings, castings, springs and fabrics. Aside from the motor vehicle companies themselves, over 1800 companies in the U. S. now produce parts and accessories for cars; 500 other firms produce machine tools and dies for manufacturers.

"Dealer Day" for Willys

WILLYS' dealers and distributors from the 48 states will be guests of Willys-Overland Motors on "Dealer Day"—Willys' biggest dealer meeting in two decades. The meeting's emphasis on the sales organization is in contrast to the company's annual get-together of the past three years, when bankers, financiers, and industrialists formed the major portion of the guest list.

Dealers will inspect the company's manufacturing and assembly facilities and witness a pageant of Willys vehicles at work in numerous agricultural and industrial chores. They will meet with company officials in a series of sales conferences to discuss problems and plans for the future.

Welcomes Model Changes

RETURN of necessity for the automobile industry to change models frequently to sustain sales would be a big help to the machine tool industry because auto makers would have to buy new equipment more frequently.

This is the belief expressed by A. K. Brown, vice president, Brown & Sharpe Mfg. Co., Providence, R. I., in commenting on the lethargy in the machine tool business.

Sales of perishable tools and parts are holding up fairly well, but volume in heavier equipment is confined to occasional replacements, he points out. Sales of equipment for new ventures seem to be less frequent than they should be.

The company resumed work last week after a six-week suspension. First two weeks were classified as vacation time. Most departments resumed work on a 35-hour week basis prevailing before the closing.

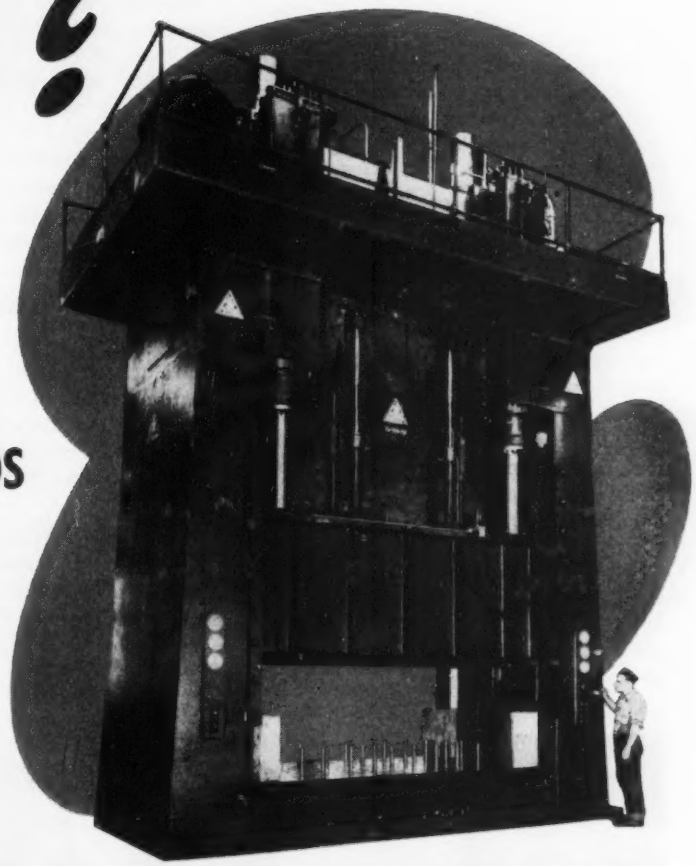
DeSoto Sets Another Record

FOR the second consecutive month Chrysler Corp.'s DeSoto division has exceeded all of its previous monthly production records. The record set in July by the 21-year-old division was broken in August despite a 4.5 day closedown.

Orders for 88 Trolley Coaches

ORDERS for 88 additional trolley coaches for British Columbia Electric Co., Vancouver, have been placed with Canadian Car & Foundry Co. Ltd., Montreal. The new vehicles, costing approximately $24,000 each, will go into service next year to carry forward the transportation company's program of conversion from street cars.

How's this capacity?



PRESS CAPACITIES UP TO
2500 TONS
72" x 150" BEDS
66" STROKES

LET US SOLVE YOUR PROBLEMS IN PART ENGINEERING, DIE DESIGNING, AND THE PRODUCTION OF YOUR . . .

METAL STAMPINGS

Our engineering capacity to assist in the development of parts will help you considerably in reducing costs. Housed in our great modern plant are the following necessary facilities, such as—

1. COMPLETE PRODUCTION MACHINE SHOP
2. ALL METHODS OF HEAT TREATING
3. METAL CLEANING AND BRAZING
4. WELDING OF ALL TYPES
5. TESTING & INSPECTION

Our capacity for service is limited only by the opportunities you afford us. May we add your firm to our steadily growing list of clients?

THE LEAKE STAMPING COMPANY

Engineers • Consultants • Manufacturers
1250 EAST FIRST STREET
MONROE, MICHIGAN

New Process

For casting metal developed by Budds Aero Castings. Simultaneously casts, molds, forges

METAL CASTING process which simultaneously casts, molds, forges and coins a product to the finished state, eliminating 60 to 70 per cent of normal machining operations on casting application, has been developed by Budds Aero Castings Inc., Canaan, Conn.

Company announces that its secret "Bacco" process has already been applied to manufacture of products for Army and Navy ordnance, Grumman Aircraft Corp. and Fairchild Engine & Aircraft Corp. and that it achieves an improvement in tensile and yield strength of 10 to 40 per cent.

Budds has produced parts for automakers, typewriter and recording machine manufacturers, hydraulic jack manufacturers, athletic supplies manufacturers and aircraft fabricators. The Bacco process, says Harold Budds, president of the company, is applicable to the forming of aluminum, steel, brass, bronze and copper.

Assets of Superior Mfg. Sold

ASSETS of Superior Mfg. Co. of Cleveland have been acquired by Bingham-Herbrand Corp. of Toledo and Fremont, O., and will operate in the future as part of the Herbrand Division.

Superior, which is improving and enlarging its line, plans to announce new tools shortly. J. E. Terry, who has been with Superior since its founding in 1932, will carry on as general manager of Superior. Company makes Bantam Bully and Big Bully air hammers, blow guns and distributes air filters, air line oilers and air line couplers.

800 Miles of Pipe to A. O. Smith

A. O. SMITH CORP., Milwaukee, will fabricate about 800 miles of 16, 18 and 20-inch pipe for the proposed 1150-mile Canadian-United States oil pipeline from the rich new Canadian oil fields around Edmonton, Alta., to Superior, Wis.

Order came from Interprovincial Pipe Line Co., Toronto, Ont. Fabricating is scheduled to be started early next March. No dollar value was placed on the order, but it was one of the largest the company has received. A wholly owned U. S. subsidiary of Interprovincial, Lakehead Pipe Line Co. Inc. will own and operate all facilities in this country. Interprovincial is a subsidiary of Imperial Oil Ltd., Toronto.

Work has already started on surveying, obtaining land rights and clearing; the entire pipeline is expected to be laid next summer.

THREE VICE PRESIDENTS: Changes occasioned by the death of Hayward Niedringhaus, late president of Granite City Steel Co., Granite City, Ill., were completed with promotion of four executives of the company. Three, pictured here, were advanced to vice presidencies. They are: N. P. Veeder, in charge of operations; J. L. Hamilton, in charge of sales; and J. D. Streett, in charge of development. Erwin Niedringhaus, the fourth, was promoted to assistant to the president, N. B. Randolph

Barlow & Seelig Renamed

SPEED QUEEN CORP. will be the new official title of the Barlow & Seelig Mfg. Co., Ripon, Wis., on Oct. 1. The 40-year-old manufacturer of ironers, washers and laundry equipment decided to make the change to tie in its advertising program more closely with the product tradename, widely identified with the company.

Maysteel Fabricates for Lindsay

METAL PANEL assemblies for truck, trailer and bus bodies and for cabinet and other types of enclosures will be manufactured by Maysteel Products Inc., Mayville, Wis., for Lindsay Structures Inc., Chicago.

The all-metal assemblies will be made at Maysteel's Sheboygan, Wis., plant and will be marketed by Lindsay. In a recent reorganization of the Chicago corporation, Clinton E. Stryker, president of Maysteel, was named to the board of directors. Lindsay which considered decentralizing its manufacturing activity decided that the manufacturing could best be handled on contract by an experienced metalworking firm.

Styberg Buys Taylor Plant

STYBERG Engineering Co. will occupy within the next few weeks the Taylor Mfg. Co. plant in Racine, Wis.

The Racine manufacturer of tools, dies, metal stampings, special machinery and metal specialties bought the property from Taylor (formerly Wright Rubber Tile) to consolidate operations and expand its business. Two older plants of Styberg will be offered for sale. Taylor moved its operations to Houston. Styberg will make its move without interruption to production; company employs 75 persons.

Chain Belt Opens Warehouse

CHAIN BELT Co. of Milwaukee, opened a modern warehouse in Dallas in conjunction with expanded facilities for its Dallas district sales office.

Briefs . . . .

Paragraphs on developments of interest and significance within the metalworking industry

Bethlehem Pacific Coast Steel Corp. will construct a structural steel fabricating shop adjoining its steel mill in Seattle. Eight acres have been purchased, and work will begin immediately. New facilities are scheduled to be ready for operation about Apr. 1, 1950.

—o—

Revere Electric Mfg. Co., Chicago, has opened a West Coast warehouse in San Francisco. It will stock a complete line of the company's lighting equipment for service stations, airports, sports fields and industrial and marine installations.

—o—

Hyatt Bearing Division of General Motors is having a three-reel training film produced for it by the Princeton Film Center, Princeton, N. J. Film will be about proper inspection and care of traction motor armature bearings used in GM diesel-electric locomotives.

—o—

Cutler-Hammer Inc., opened a new sales office in Louisville. Office is a branch of the company's Cincinnati district office. Louisville territory includes most of Kentucky and a part of Indiana. E. C. Bolton will direct sales.

—o—

McNally Pittsburg Mfg. Corp., Pittsburg, Kans., started construction of a new coal research laboratory which will add 4500 sq ft of floor space to facilities in Pittsburg. Building is scheduled for completion in November. McNally Pittsburg provides the coal industry with sink-float, screening and ash determination analyses, and does coal plant design engineering.

—o—

Feature of a revised price list giving quantity prices on standard drill jig bushings and liners is the elimination of calculating discounts. It is available from Colonial Bushings Inc., P. O. Box 37, Harper Station, Detroit 13.

—o—

Whiton Machine Co., New London, Conn., appointed three exclusive representatives. Screw Machine Tool & Supply Co., Milwaukee, will handle lathe chucks in Wisconsin; Pacific Coast Tool Co., Oakland, Calif., will handle lathe chucks, centering machines; special purpose milling machines and gear cutting machines in northern California; the same line will be handled in southern Ohio by Woodall Engineering & Sales Co., Dayton, O.

—o—

John A. Roebling's Sons Co., Trenton, N. J., manufacturer of wire products, says its new Denver office and warehouse will be ready for occupancy at the end of this month.

—o—

Midland Structural Steel Corp., Division of Allied Structural Steel Cos., now has plant and shop offices located at 1435 165th St., Hammond, Ind.

—o—

Air Reduction Sales Co., New York, appointed Essex Welding Equipment Co., Newark, N. J., authorized dealer in Newark and surrounding areas for Airco products. Essex consolidated W & E Supply Co. to broaden its line of welding equipment.

—o—

Natkin & Co., St. Louis, air conditioning, plumbing and heating firm, is now in the automotive field with a complete line of products under its own name. Among products to be distributed nationally under the Natkin name are Service Merchandisers, Appearance Servicers, storage cabinets and portable service benches. Firm is appointing jobbers and manufacturers' agents throughout the country.

Pin-Up

PIN-UP king of metalworking companies could be Key-Tag Checking System Co., Cleveland, world's largest distributor of big, 4¼ and 5-inch, safety pins.

Key-Tag markets 300,000 pins annually, or about 40 per cent of the total volume in these sizes. They are used in connection with a patented key-tag it makes for commercial laundries which keeps individual washings from getting mixed. The pin, a ball point unit manufactured to Key-Tag's specifications, pins shut the nylon bag in which laundry is washed and is attached to the numbered key-tag. The pins, sold by Key-Tag to the 4000 laundries using its identification system, are made by Oakville Co., Oakville, Conn., and Risdon Mfg. Co., Naugatuck, Conn.

Gas Machinery Co. of Cleveland appointed John D. Tebben & Co., Detroit, sales representative in Michigan. His company, which functions as management consultants, also was appointed sales consultant for Weldaloy Products Co.'s line of resistance welding products in the Wolverine state. Weldaloy is in Detroit.

—o—

General Motors' 6000th diesel locomotive unit left the production lines of Electro-Motive Division of GM. It was a 1000-hp switcher for the Chesapeake & Ohio and was built at Plant No. 3 in Cleveland. An average of seven and a half locomotive units are completed each working day in the three Electro-Motive plants.

—o—

Russell Mfg. Co., Middletown, Conn., purchased the Howard Asbestos Co., Northfield, Vt., to insure a supply of asbestos yarns for Russell's automotive friction materials, nationally known as Rusco brake linings and clutch facings. Howard's name will be changed to Russell Asbestos Corp. and will be operated as a wholly owned subsidiary.

—o—

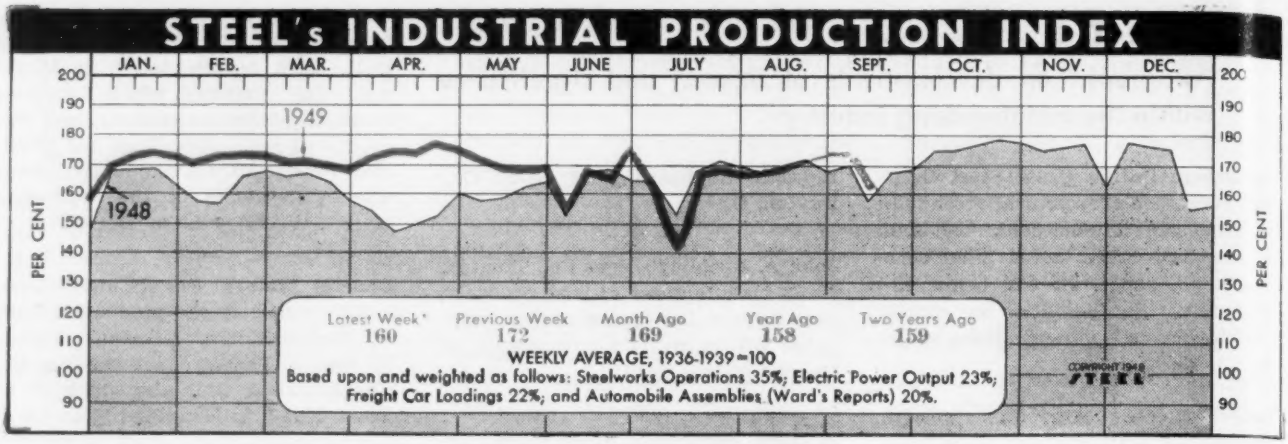
Jas. P. Marsh Corp., Skokie, Ill., has purchased Electrimatic Valve Division of Simoniz Co., Chicago. Electrimatic line of pressure actuated condensing water regulators for cooling water through condensers, solenoid stop valves for cooling systems, suction throttling valves and back pressure regulators for evaporators will be manufactured and distributed by Electrimatic Division of Jas. P. Marsh Corp. The Marsh line includes refrigeration gages, dial thermometers and testing equipment.

—o—

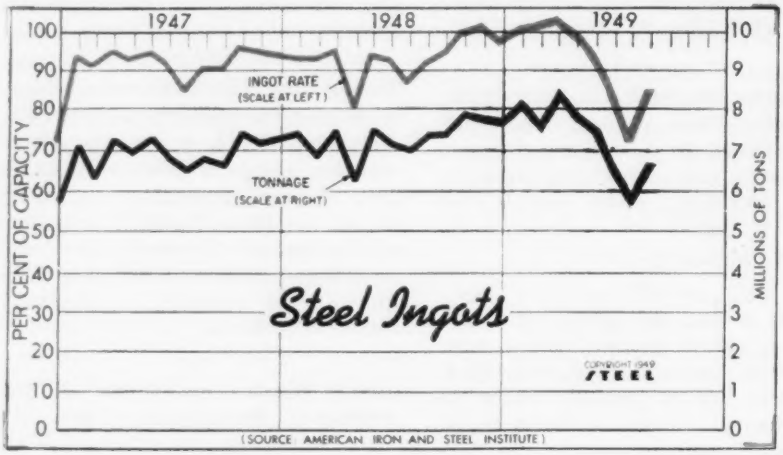
Colonial Broach Co., Detroit, appointed Dolan Industrial Sales, Houston, representative for distribution and sales engineering in southern Texas on broaching machines, broaches and broach sharpening equipment. Dolan will also represent Colonial Bushings Inc., Detroit, manufacturers of drill jig bushings and liners in the same territory.

—o—

Westinghouse Electric Corp. will build the world's most powerful electric transformer capable of handling 110,000 hp of electricity. Transformer, with more than 15 times the power of the biggest railroad locomotive, will be used in the Portland, Oreg., and Seattle, Wash., areas by the Bonneville Power Administration to substitute for other transformers as they are disconnected for repair and maintenance.


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
PER CENT
1949
1948
Latest Week* 160
Previous Week 172
Month Ago 169
Year Ago 158
Two Years Ago 159
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
COPYRIGHT 1949 STEEL

*Week ended Sept. 10 (preliminary).

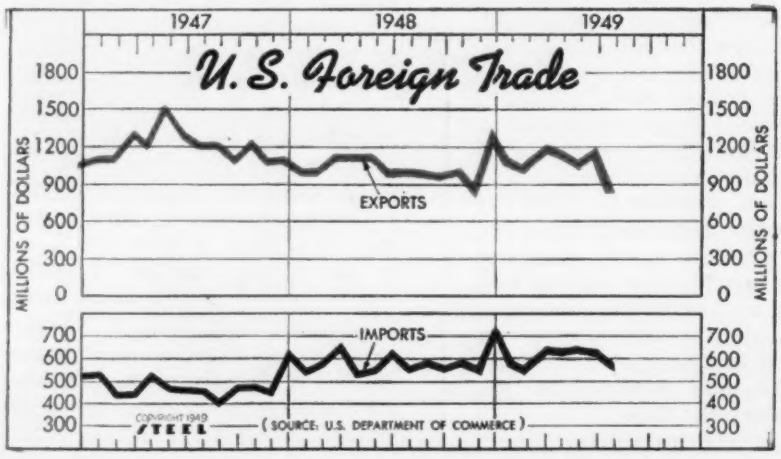


Steel Ingots

	Production (Net Tons—000)			Operating Rate (% of Capacity)		
	1949	1948	1947	1949	1948	1947
Jan.	8,183	7,473	7,213	100.2	93.6	93.2
Feb.	7,481	6,940	6,422	101.4	93.0	91.9
Mar.	8,388	7,608	7,307	102.7	95.3	94.4
Apr.	7,785	6,218	7,043	98.4	80.4	93.9
May	7,590	7,572	7,329	92.9	94.8	94.7
June	6,498	7,256	6,969	82.2	93.8	92.9
July	5,781	7,067	6,570	70.9	88.7	85.1
Aug.	6,711	7,438	6,982	82.2	93.1	90.2
Sept.	....	7,416	6,789	....	96.1	90.8
Oct.	....	7,987	7,560	....	100.0	97.7
Nov.	....	7,787	7,233	....	100.7	96.5
Dec.	....	7,771	7,366	....	97.5	95.4
Total	....	88,534	84,784 Ave.	....	94.0	93.0

Steel Shipments

	(Net Tons)		
	1949	1948	1947
Jan.	5,788,632	5,410,438	5,061,333
Feb.	5,519,938	5,046,115	4,626,424
Mar.	6,305,681	5,978,551	5,304,415
Apr.	5,596,786	5,096,161	5,445,993
May	5,234,862	5,321,375	5,442,343
June	5,177,259	5,476,774	5,263,711
July	4,534,855	5,229,880	4,974,566
Aug.	.....	5,329,060	5,278,223
Sept.	.....	5,511,474	5,118,839
Oct.	.....	5,952,008	5,681,597
Nov.	.....	5,732,256	5,216,990
Dec.	.....	6,056,282	5,613,036



Foreign Trade

Bureau of Foreign and Domestic Commerce
(Unit Value—$1,000,000)

	Exports			Imports		
	1949	1948	1947	1949	1948	1947
Jan.	1,086	1,092	1,114	589	547	531
Feb.	1,029	1,086	1,146	568	585	437
Mar.	1,152	1,139	1,327	632	670	444
Apr.	1,149	1,121	1,299	534	530	512
May	1,078	1,102	1,503	541	551	474
June	1,104	1,015	1,320	527	625	463
July	897	1,019	1,265	456	563	450
Aug.	....	990	1,265	...	606	400
Sept.	....	926	1,109	...	560	481
Oct.	....	1,021	1,235	...	600	492
Nov.	....	820	1,138	...	554	454
Dec.	....	1,285	1,172	...	720	603

The Business Trend

LABOR DAY shutdowns account for most of the decline in STEEL's industrial production index which slipped 12 points to 160 per cent (preliminary) of the 1936-1939 average from 172 in the preceding week. The index for the week ended Sept. 11, 1948, was 158.

LABOR—The improved labor situation in the metalworking industry promises a spurt in activity which will not be reflected statistically for several weeks. The lengthy pending status of steel wage negotiations tended to freeze much of the forward planning for all metalworking companies, but a warmer labor climate should encourage implementation of deferred projects.

STEEL—In spite of the Labor Day holiday, output of steel ingots and castings held at 85 per cent of capacity in the week ended Sept. 10, only 1 percentage point from the previous week. In the corresponding seven days last year the rate was 95 per cent. The next month will disclose how much of the late summer steel buying was strike insurance or normal demand. Consensus is that much of the purchasing resulted from normal needs.

AUTOMOBILES—The Labor Day holiday affected auto production more noticeably. Assemblies for the week ended Sept. 10 totaled 124,043, compared with 144,317 a month ago but 78,677 a year ago. A possible strike at Ford is the major production worry now. Auto producers are planning to keep output schedules high throughout the year, but they are aware September normally is a poor month because of a seasonal sales decline. If any faltering is detected, it is probable curtailments would be ordered for October and November.

RAILROADS—Domestic freight car deliveries during August totaled 7178, says the American Railway Car Institute. July production was 6434. Output of the leading types of cars was: Box 877, hopper 2880, gondola 1816, refrigerator 870, tank 520. The five-day week for railroads accounts for some of the decline in loading of revenue freight since Sept. 1. Coal loadings are increasing slightly, but all other freight classifications are falling sharply.

COAL—Estimated bituminous coal production in the U. S. for the week ended Sept. 3 is 8,050,000 tons. This is the ninth of the three-day work weeks ordered by John L. Lewis. Output for the corresponding week last year was 12,253,000 tons. Production from Jan. 1 through Sept. 3, 1949, was about 321,158,000 tons. Output from Jan. 1 through Sept. 4, 1948, was 396,482,000 tons.

PRICES—Commodity prices—the BLS index stands at 152.7 for the week ended Sept. 6—have bounced back from a mid-August decline and are at the same level they were during the week ended Aug. 9. The index dropped to 151.9 by Aug. 23 before beginning to climb back. Prices of farm products, textiles, fuel and metals shared in the increase in the Sept. 6 week. There was a slight decline in food prices. Building materials remained unchanged.

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	85.0	86.0	82.5	95.0
	Electric Power Distributed (million kilowatt hours)	5,258	5,544	5,530	5,166
	Bituminous Coal Production (daily av.—1000 tons)	1,342	1,318	1,258	1,983
	Petroleum Production (daily av.—1000 bbl)	4,851	4,765	4,723	5,346
	Construction Volume (ENR—Unit $1,000,000)	$146.5	$155.2	$257.3	$106.9
	Automobile and Truck Output (Ward's—number units)	124,043	146,039	144,317	78,677
	*Dates on request. †1949 weekly capacity is 1,843,516 net tons. 1948 weekly capacity was 1,802,476 net tons.				
TRADE	Freight Car Loadings (Unit—1000 cars)	706†	704	728	789
	Business Failures (Dun & Bradstreet, number)	148	174	153	83
	Money in Circulation (in millions of dollars)‡	$27,589	$27,389	$27,409	$28,287
	Department Store Sales (changes from like wk. a yr. ago)‡	−4%	−1%	−12%	+16%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$10,492	$11,322	$11,381	$9,761
	Federal Gross Debt (billions)	$256.4	$255.9	$254.5	$252.7
	Bond Volume, NYSE (millions)	$9.7	$10.0	$15.7	$12.6
	Stocks Sales, NYSE (thousands)	3,201	3,535	5,876	3,962
	Loans and Investments (billions)†	$65.8	$65.1	$63.8	$63.2
	United States Gov't. Obligations Held (millions)†	$37,307	$37,114	$35,773	$34,714
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Composite Finished Steel Price Average	$91.55	$91.55	$91.55	$93.86
	STEEL's Nonferrous Metal Composite‡	180.3	180.6	180.0	220.7
	All Commodities†	152.7	152.4	152.7	168.4
	Metals and Metal Products†	168.9	167.9	167.9	172.0
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100.				

Men of Industry

WALTER H. STEWART

ARTHUR E. MAUS

GEORGE A. POCKELS

Walter H. Stewart has been appointed vice president of Virginia Steel Co. Inc., Richmond, Va. He was formerly sales manager of the Reinforcing Products Division, Truscon Steel Co. in Youngstown. Mr. Stewart has devoted his entire career to the design and sale of steel building products for all types of building construction.

—o—

Chain Belt Co., Milwaukee, announces appointments as follows: **William J. Sparling,** works manager since 1945, has been named vice president and manager of the Chain & Transmission Division; **E. P. Meyer,** assistant works manager, was promoted to works manager to succeed Mr. Sparling; **Roscoe O. Byers** was appointed factory manager of the division. **Clarence B. Ringham** was appointed factory manager of the Heavy Machinery Divisions, and **George B. Flanigan,** manager of trade relations for the company.

—o—

A. E. Purman has been appointed by Wellman Bronze & Aluminum Co., Cleveland, as its Michigan representative. He will handle the sale of Well-cast magnesium, aluminum and bronze, permanent mold and sand castings and Well-made wood and metal patterns.

—o—

J. A. Durr, who recently resigned as technical adviser to the general manager of Albion Malleable Iron Co., Albion, Mich., has joined the staff of Erie Malleable Iron Co., Erie, Pa.

—o—

Vernon H. Patterson, formerly sales metallurgist of American Brake Shoe Co., New York, has joined the development staff of Climax Molybdenum Co. at Detroit.

Arthur E. Maus has been appointed director of purchases, Burroughs Adding Machine Co., Detroit, succeeding **E. M. Helwig,** retired. Mr. Maus joined the company in 1947 and for the last two years has been technical assistant to the president. Prior to that he had been chief production engineer of Eureka-Williams Corp., Detroit, and in earlier years was associated with Aluminum Cooking Utilities Co., New Kensington, Pa.; L. A. Young Spring & Wire Corp., Detroit; and Lindsay Engineering Co., Cleveland, where his work was in the fields of production control and engineering.

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George V. Wise has been appointed advertising manager of H. B. Davis Co., Baltimore. He formerly was sales promotional manager and succeeds **C. Carroll Cooper.**

—o—

P. L. Edmonds, associated with Arcos Corp., Philadelphia, since 1944 in testing and field engineering work, has been transferred to the New England district office, and will be the Arcos field engineer in Boston, Providence, R. I., and Worcester, Mass., areas. Mr. Edmonds will have his headquarters in the Statler Bldg., Room 900, Boston.

—o—

Aetna-Standard Engineering Co. announces the following changes: **E. A. Matteson,** formerly sales engineer, Sheet & Strip Equipment Division, has been made manager of export sales and manager of the Patent Division; **R. L. Allshouse,** formerly sales engineer, Sheet & Strip Equipment Division, has become sales manager of that division; and **D. C. Mills** of the proposal engineering department has become a sales engineer.

George A. Pockels has been appointed director of European operations for Clearing Machine Corp., Chicago. He will have headquarters in Paris. Mr. Pockels' long association with the company and his knowledge of presses, either from operating or design and construction viewpoints, will enable him to provide valuable assistance to European manufacturers of metal products, as well as make information quickly available to prospective buyers.

—o—

Elliott C. Paddock has been appointed to a newly created post of vice president in charge of sales, Graton & Knight Co., Worcester, Mass. Since 1939 Mr. Paddock has been general sales manager of Corbin Screw Division, American Hardware Corp., New Britain, Conn. He had charge of all sales, domestic and foreign, for that company. For 15 years prior to 1939 he was field sales manager in charge of domestic sales for Greenfield Tap & Die Corp.

—o—

Emerson D. Ogle has been appointed manager, industrial sales department, of SKF Industries Inc., Philadelphia. He succeeds **C. D. Cummings,** resigned. Mr. Ogle served two years as field engineer in the Buffalo sales office and for the last two years has been manager of the automotive and electrical section of the industrial department.

—o—

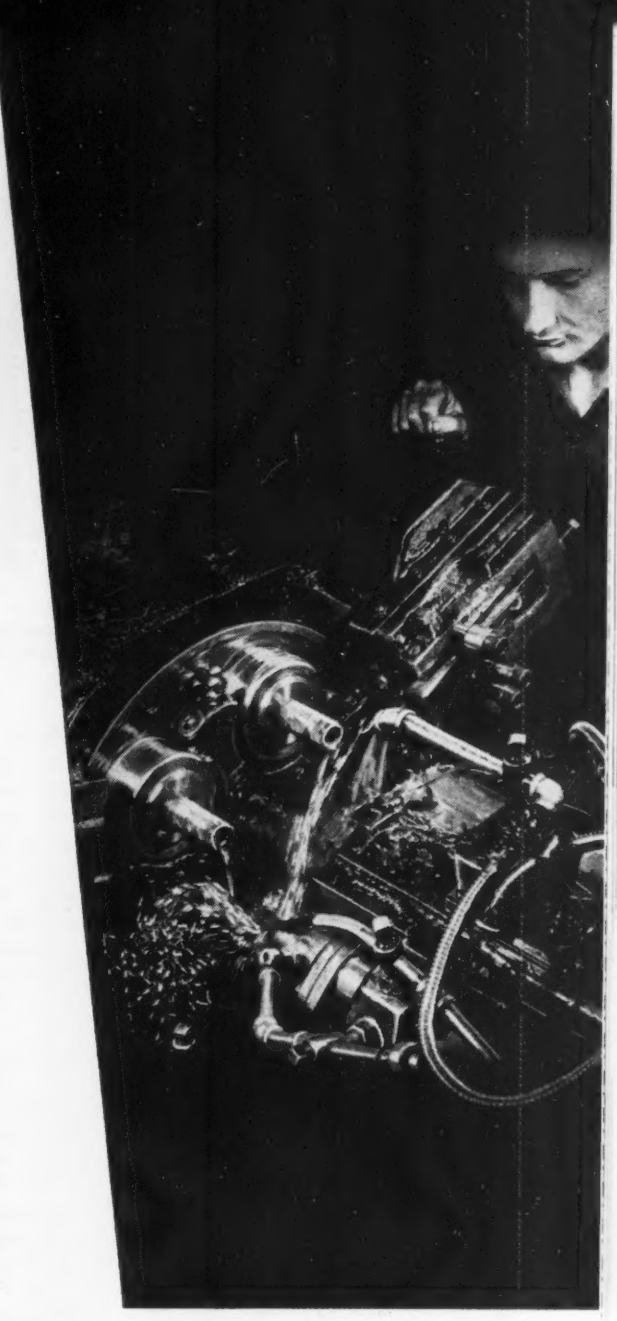
Joseph Graziano has been appointed assistant manager at the Newark, N. J., facility of Federated Metals Division, American Smelting & Refining Co. **James F. Orr** was promoted to plant superintendent, succeeding **E. R. Marble Jr.,** who was

NEW!

SUNICUT

812W and 817W

DUAL-PURPOSE CUTTING OILS FOR AUTOMATIC SCREW MACHINE WORK



THE NEW Sunicut grades have been thoroughly "Job Proved." Superlative results have been obtained on automatics machining all types of steel and brass at all practical speeds and feeds. These oils serve both as lubricant and cutting fluid. Their use eliminates the problem of cutting oil dilution. They are transparent, non-emulsifying oils compounded with Sun's revolutionary, all-petroleum additive, Petrofac. For further information, fill in and mail the coupon.

SUNICUT 812W is recommended for superior performance on high speed, multiple spindle automatics machining low-carbon steels, alloy steels and brass.

SUNICUT 817W is a higher viscosity oil for use on larger automatics machining all types of steel and brass. It is recommended for severe operations where heavier cuts are taken and higher temperatures maintained.

Sun Oil Company, Dept. S-9
Philadelphia 3, Pa.

Please send me your informative booklet describing the excellent results being obtained in automatic screw machine work with Sunicut 812W and 817W.

Name _____

Title _____

Company _____

Address _____

City _____ Zone _____ State _____

SUN OIL COMPANY • *Philadelphia 3, Pa.*

In Canada: Sun Oil Company, Ltd.
Toronto and Montreal

SUN PETROLEUM PRODUCTS

"JOB PROVED" IN EVERY INDUSTRY

SUNOCO

Sunicut and Petrofac are trademarks of Sun Oil Company

transferred to the central metallurgical department as assistant to **John A. West,** manager.

—o—

James E. Brown has been appointed assistant general superintendent of the Cuyahoga Works of American Steel & Wire Co., Cleveland, a newly created position. He has been associated with this subsidiary of U. S. Steel Corp. for 20 years, and moves to his new assignment from the staff of **H. B. Jordan,** vice president of operations of the company. Mr. Brown will serve as assistant to **H. L. Jenter,** general superintendent of the Cuyahoga Works.

—o—

Lon A. Fleener, former Wholesale Division sales manager of White Motor Co., Cleveland, has been appointed regional manager for the Kansas City region. In his new position Mr. Fleener will have full supervision of branch and distributor operators in the mid-western area embracing several states and will make his headquarters at Kansas City. **N. O. Gresham** will succeed Mr. Fleener at Cleveland. Mr. Gresham formerly served as wholesale manager at Kansas City, and prior to joining the White organization was with Firestone Tire & Rubber Co., Akron, for more than 20 years, specializing in all phases of merchandising and management.

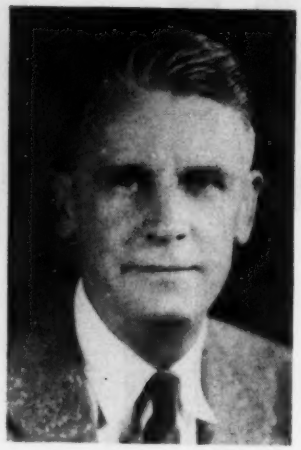
—o—

Dr. Anson Hayes has asked to be released as director emeritus of the research laboratories and special consultant to the general management of Armco Steel Corp., Middletown, O. Dr. Hayes was elected vice president of Armco in November, 1946, and has been director emeritus of the laboratories since 1947.

—o—

Joseph B. Clough has become associated with Godfrey Tool & Supply Inc., Cleveland, as vice president of the company. For the past year he has been assistant to the president of A. W. Hecker Co. and was previously vice president and sales manager of Johnston & Jennings Co. Mr. Clough began his industrial career as assistant metallurgist of E. I. du Pont de Nemours & Co. in Wilmington, Del.

JOSEPH B. CLOUGH



JOHN C. MURRAY

Appointed general sales manager, Edgar E. Brosius Co. Inc., Pittsburgh. Noted in STEEL, Sept. 12 issue, p. 103

—o—

Sheffield Steel Corp., Kansas City, Mo., announces that **A. F. Moog** has resigned as purchasing agent for its Houston, Tex., operations, and that **J. A. Street,** who since 1948 has been supervisor of raw materials, will, in addition to these duties, head up the purchasing organization in Houston as acting purchasing agent.

—o—

Kenneth L. Mills has been appointed product manager of oil field sales for the Columbus, O., Division of International Derrick & Equipment Co., Columbus, O., and **Frank Beach** was appointed assistant to Mr. Mills.

—o—

Julian M. Girardeau has been promoted to district sales engineer in charge of the New Orleans office of Ingalls Iron Works Co. He formerly served as sales engineer at the firm's main office in Birmingham. Mr. Girardeau will also represent subsidiaries, Ingalls Shipbuilding Corp. and Steel Construction Co., as well as Birmingham Tank Co., division of Ingalls Iron Works Co.

—o—

W. L. Walsh has been appointed general manager of sales, and **W. L. Hall** district sales manager, New York office, for the Steel Division of Stanley Works, Bridgeport, Conn. Mr. Walsh succeeds the late **E. M. Hayes,** and has been district sales manager of the New York office for the past five years. He has worked in the sales division in various capacities for the last 25 years, covering New England, New York and New Jersey. Mr. Hall has been associated with the company since 1937.

—o—

Albert Levinson, president, General Pipe & Supply Co., Los Angeles, has been named chairman of the public relations committee of the National Scrap Iron & Steel Institute.

—o—

Roger H. Bolin, formerly advertising manager of the Appliance Division at Mansfield, O., of Westinghouse Electric Corp., has been named assistant to **J. M. McKibbin,** vice president and general manager in charge of consumer products for Westinghouse. **J. R. Clemens** succeeds Mr. Bolin at Mansfield. He formerly was assistant manager of appliance advertising. **Hendley Blackmon,** managing editor of *Electrical World* since 1947, has been appointed assistant manager of engineering association activities for the corporation, working with Westinghouse engineers in the preparation of papers to be presented before engineering associations. **Bernard F. Langer** was appointed manager of structural and heat engineering, and **Erling Frisch,** manager of control engineering in the engineering department of the corporation's Atomic Power Division.

—o—

William C. Howard Jr. and **Walter E. Foreman** have been appointed field engineers by Norton Co., Worcester, Mass. Mr. Howard will report to **Ronald W. Price,** manager of District 2, comprising Connecticut, with headquarters in Hartford, Conn. Mr. Foreman will report to **Fred P. Hays,** district manager in Cleveland.

—o—

Edward S. Steigner, a member of the

EDWARD S. STEIGNER

You Can Cut Disc Grinding Costs with NORTON *Vitrified* DISCS!

You get a faster, cooler cutting action on many surfacing jobs with Norton Vitrified "P" or porous type discs, because the grain spacing in these discs is accurately controlled for extra chip clearance and the cutting action is uniform from periphery to hole. This makes them particularly well-suited for handling alloy steel and other heat-sensitive parts. Their scientifically controlled structure offers decided advantages over the old perforated discs sometimes used.

You get longer life on many surfacing jobs with these Norton discs because vitrified bond has the unique ability of holding the abrasive grain until its complete cutting life has been utilized, and then releasing the grain when it commences to dull. This eliminates the need for frequent dressing.

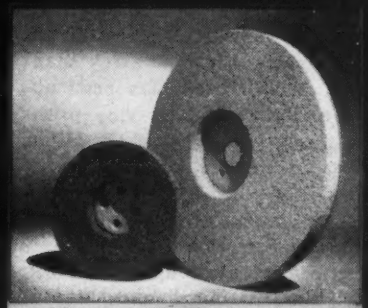
You eliminate aging and storing problems often encountered with magnesite bonded discs when you use Norton Vitrified Discs for vitrified bond is stable and mature. These Norton discs are ready for use immediately upon delivery or may be stored until needed as the grinding properties will remain unchanged.

You eliminate coolant problems, for vitrified bond is not affected by water or any commercial grinding fluid.

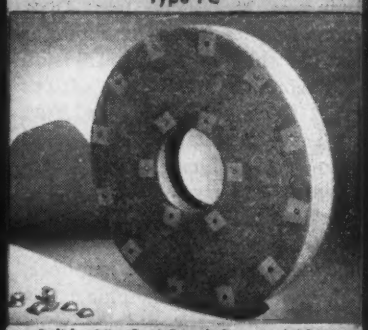
You save on initial expense, for vitrified bonded discs in sizes up to 30" in diameter cost considerably less than resinoid.

If you are disc-grinding piston rings, coil springs, ball-bearing races, magnets, etc., why not take advantage of these cost-cutting features offered by Norton Vitrified Discs? Your Norton abrasive engineer or distributor will be glad to study your disc grinding operations and to help you in selecting the most economical disc for each job.

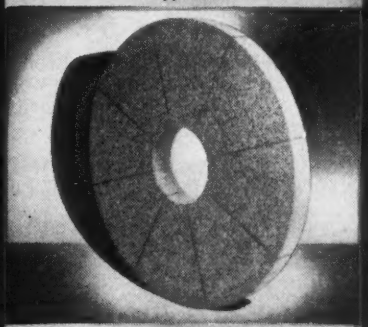
W—1255



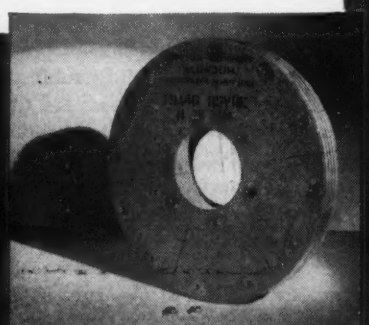
Solid—Vitrified Bond, Plate Mounted, Type PC



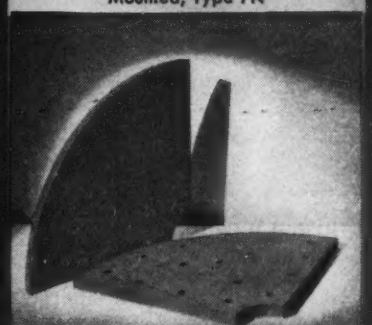
Solid—Vitrified Bond, Inserted Nut, Type N



Segmental—Vitrified Bond, Plate Mounted, Type PN



Segmental—Vitrified Bond, Inserted Nut, Type N



Segments—Resinoid Bond, Plate Mounted, Type PC

NORTON COMPANY, WORCESTER, MASS. New York, Chicago, Detroit, Cleveland, Philadelphia, Pittsburgh, Hartford, St. Louis, Los Angeles

metallurgical department of Youngstown Sheet & Tube Co., Youngstown, for 15 years, has been appointed tubular products development engineer with headquarters at the Campbell Works, Youngstown. He will be associated with **Karl L. Fetters,** special metallurgical engineer.

—o—

Chicago Metal Hose Corp., Maywood, Ill., announces sales department organizational changes as follows: **Shelby A. McMillion** has been appointed assistant to **A. S. Keller,** vice president in charge of sales; **T. K. Wells,** formerly regional sales manager, Bellows Division, has been appointed assistant to the vice president in charge of sales; **E. L. Hiter,** formerly district sales manager at the New York office, has been appointed manager of sales for the Eastern Division which encompasses sales offices at Boston, New York, Philadelphia, Pittsburgh, and Atlanta; **A. W. McGuire,** formerly regional sales manager, Expansion Joint Division, has been appointed manager of sales for the Western Division which encompasses sales offices at Detroit, Cleveland, St. Louis, Fort Worth, Tex., Glendale, Calif., San Francisco and Chicago. Mr. McMillion was formerly with McGraw-Hill International Corp.

—o—

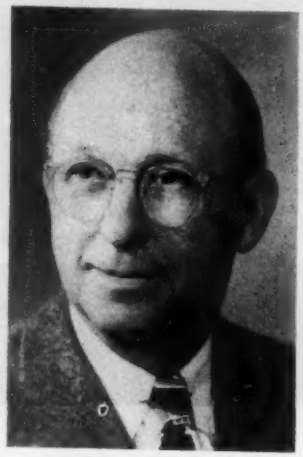
John T. Ramsden, chief engineer, Tabor Mfg. Co., Philadelphia, has retired after 48 years' service with the foundry equipment design and manufacturing concern.

—o—

Joseph M. Williams Jr. has been

JOSEPH M. WILLIAMS JR.

appointed vice president in charge of strip steel operations for Universal Sheet & Strip Steel Co., Chicago. Since 1922 Mr. Williams has been associated with Acme Steel Co., Chicago, in production, service, sales engineering and strip steel sales.



EDWARD R. COLE

Edward R. Cole, an electrical engineer in the development of carbon production, has been elected a vice president of United Carbon Products Co., Bay City, Mich. He will be in charge of engineering and production in the Graphite Anode Division. Mr. Cole spent 21 years with Acheson Graphite Corp., Niagara Falls, N. Y., and the following four years as a consulting engineer. For the past 13 years he has been associated with Dow Chemical Co., Midland, Mich.

—o—

W. T. Richardson, formerly with Bethlehem Supply Co., Corsicana, Tex., has joined Texas Engineering & Mfg. Co. Inc., Dallas, to head up the Temco tool design department. With 20 years' experience as a tool designer and tool and die maker, Mr. Richardson set up the tool design department for Bethlehem Supply. Previously he was with Dallas Engineering Co. and Rowe Tool & Die Co., both of Dallas; Toolthrift Co., Pittsburgh, and Mountjoy Machine Co., Houston, Tex.

—o—

Clayton B. Herrick, former editor of *Industry & Welding,* has been appointed Ohio representative of Reed Engineering Co., Carthage, Mo. Mr. Herrick has formed the C. B. Herrick Co. to handle the Reed line of power turning rolls, plate bending rolls and automatic welding fixtures. He first became connected with the welding industry in 1934 when he joined Lincoln Electric Co., where he served in production, engineering and sales capacities.

—o—

Frank M. Weaver & Co. Inc., Lansdale, Pa., structural steel fabricator, announces that **Jack Warren** will now represent the firm in the New York area for sales of fabricated structural steel, and that **William H. Hunt,** who has been New York sales agent, representing the company in that area for 22 years, has retired.

—o—

Henry A. Roemer Jr. has been elected vice president and general manager of Sharon Steel Corp., Sharon, Pa., a newly created position. He will directly assist his father, who is president and chairman of the board. Mr. Roemer Jr. has been vice president and director of purchases for several years. **R. C. Garlick,** assistant vice president, has been named general manager of sales to succeed **G. F. Griffith. N. R. Mehler** was promoted from district manager of sales at New York to assistant general manager of sales at Sharon, and **W. J .McCune,** promoted from manager of stainless and alloy sales to assistant general manager of sales. **T. M. Galbreath** has been transferred from the Philadelphia to the New York office to succeed Mr. Mehler.

—o—

Charles B. Greene, employment manager of the Bristol, Conn., plant of the New Departure Division, General Motors Corp., retired Aug. 31 after 33 years of service with the firm.

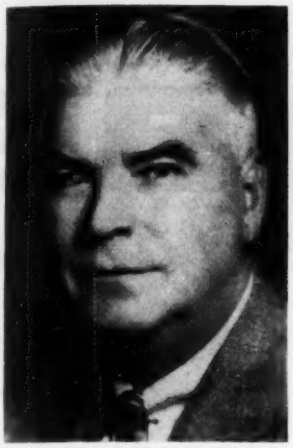
—o—

Floyd S. Hoskinson has joined Youngstown Sheet & Tube Co., Youngstown, as superintendent of its cold drawn bar department at the Brier Hill plant. He succeeds **J. G. O'Malley,** who left the company recently.

—o—

James Holland, for 12 years sales manager of the Phillips Division of American Screw Co., Providence, R. I., has been appointed sales manager of Camcar Screw & Mfg. Corp., formerly Camcar Products Co., in Rockford, Ill. Mr. Holland relieves **Ray Carlson,** vice president and general sales manager, of his sales duties, permitting Mr. Carlson to devote his time fully to production management.

JAMES HOLLAND



N. C. REED
Vice president in charge of sales, Wheeling Steel Corp., Wheeling, W. Va. Noted in STEEL, Sept. 5 issue, p. 70

JOHN L. NEUDOERFER
Executive vice president, Wheeling Steel Corp., Wheeling, W. Va. Noted in STEEL, Sept. 5 issue, p. 70

W. M. HALL
General manager of sales, Wheeling Steel Corp., Wheeling, W. Va. Noted in STEEL, Sept. 12 issue, p. 103

OBITUARIES . . .

Donald C. Bakewell, 61, sales vice president, Blaw-Knox Co., Pittsburgh, died Sept. 10 at his summer home in Hyannisport, Mass. He had been associated with the company since 1937. In addition to being sales vice president, he was a director and member of the executive committee. Prior to his association with Blaw-Knox, Mr. Bakewell was president, Duquesne Steel Foundry Co., Pittsburgh, from 1917 to 1930, following which he was first vice president of the merged successor company, Continental Roll & Steel Foundry, until 1937. He was a director and member of the executive committee of Illinois Zinc Co., president and a director of Pittsburgh Forge Iron Co., and a director of E. H. Jennings Bros. Co.

—o—

E. T. Stannard, 66, associated with Kennecott Copper Corp., New York, for 39 years, 18 of them as president, **Arthur D. Storke,** 54, former president, Climax Molybdenum Co., who had been named to succeed Mr. Stannard as president in January, and **R. J. Parker,** 52, a Kennecott vice president, were killed when an airlines plane crashed near Quebec, Sept. 9. They were enroute to inspect properties of Quebec Iron & Titanium Co., two-thirds of which is owned by Kennecott, and which was headed by Mr. Parker.

—o—

Arthur E. Ulrich, 58, sales executive of Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., died Sept. 8 while on business in Toledo, O. For the last 21 years he was district sales manager in Detroit and the middle eastern states. He joined the company in 1925. Mr. Ulrich became associated with H. B. Kraut, former board chairman of Giddings & Lewis, when Mr. Kraut was manager of the Machinery Division of Joseph T. Ryerson & Son Inc., Chicago. He remained with that company until 1922 when he became chief engineer of Ferguson Furnace Co., Toledo, O., and from 1924 to 1925 was chief engineer, Colorizing Co., Pittsburgh. He again joined Mr. Kraut at Giddings & Lewis Machine Tool Co.

—o—

James W. Chalmers, sales engineer for 25 years with Wm. K. Stamets Co., Pittsburgh, died Sept. 1. He was a member of the American Society of Tool Engineers and served on the War Production Board in Washington during World War II.

—o—

Joseph C. W. Van Blerck, 74, retired marine engine manufacturer, died Sept. 5 at his home in Fort Lauderdale, Fla. He joined American Car & Foundry Co. in Detroit shortly after he came to this country from Holland in 1901. He later became associated with the late Henry Ford in the early development of the Ford automobile. In 1910 he founded the Van Blerck Engine Co. in Detroit, which he later moved to Red Bank, N. J.

—o—

Walter E. Duncanson, 69, retired chairman of the board of J. G. Wilson Corp., New York, died Sept. 5. He retired in 1942 after 38 years with the company. He was president of the corporation from 1929 to 1939.

—o—

Henry L. Tucker, 63, for 33 years a staff engineer with Babcock & Wilcox Tube Co., Beaver Falls, Pa., died Sept. 8 of a heart attack. He was one of the engineers who worked on a joint project of Babcock & Wilcox Co. and Republic Steel Corp. to produce steel by a continuous casting process, completion of which was announced last month.

—o—

Robert A. Graves, 49, sales manager, General Electric Appliances Inc., New York, died Sept. 9.

—o—

Carl Lippold, 59, chief engineer, J. M. Nash Co., Milwaukee, died Sept. 8 while enroute to the office. He had been with the company for the last 36 years.

—o—

Herbert C. Ellsworth, 68, president of White Tool & Supply Co., Cleveland, from 1912 until he retired in 1945, died Sept. 7.

—o—

Harry E. Orr, in the patent development division of National Malleable & Steel Castings Co., Cleveland, for over 40 years, died Sept. 7. He had retired this year.

—o—

Liston T. Lange, 53, vice president and part owner, Ferguson & Lange Foundries Inc., Chicago, died of a heart attack Aug. 29.

—o—

Walter P. Bell, 48, vice president and general sales manager, Ingersoll-Rand Co., New York, died Sept. 10. He was manager of sales in New England before he went to New York as a vice president.

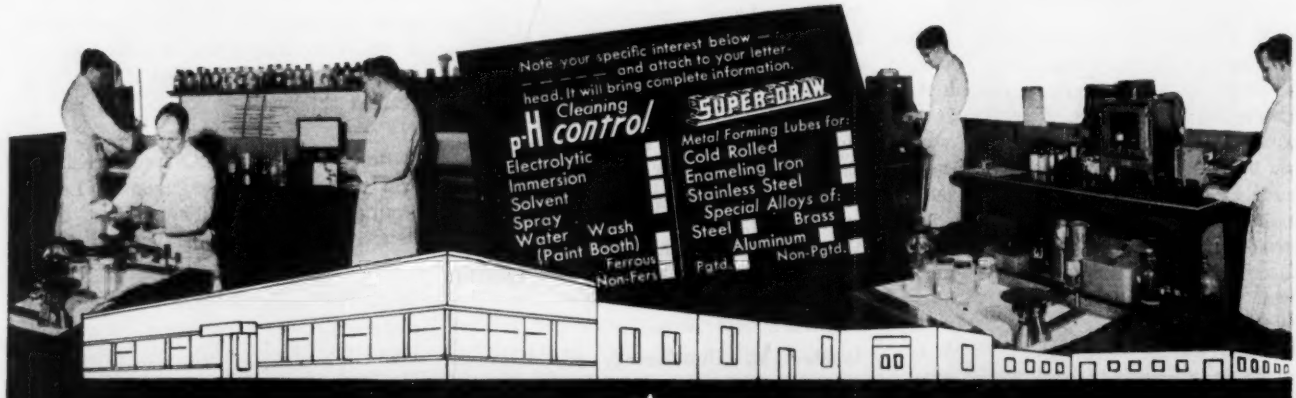
—o—

William D. Wendle, 54, credit manager, Stamford Division, Yale & Towne Mfg. Co., Stamford, Conn., died Sept. 6. He joined the company in 1915 as an assistant in the accounting department and was appointed credit manager a month ago.

SPRA-LUBE

Lubricates the Overspray

"SPRA-LUBE" Water Wash Compound for paint spray booths actually "lubricates the overspray" . . . there are chemicals that act as carrier and water softener . . . but with NORTHWEST "SPRA-LUBE"—each particle of paint is coated with a non-volatile solvent. And as it hits the waterspray it can't stick to the back curtain or any of the eliminators. The booth keeps clean and the sludge remains floating for easy skimming . . . The use of "SPRA-LUBE" guarantees both lowest material and maintenance costs . . . Let our technicians consult you on this or any of your other cleaning problems . . . there are thirty-five standard Northwest products in this field alone.



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NORTHWEST CHEMICAL CO.

9310 ROSELAWN AVE. DETROIT 4, MICH.

pioneers in pH cleaning control—serving you since '32

Engineering News . . . AT A GLANCE

HEAVY NICKEL "CLADDING"— To meet plating demands of heavy industry in the Milwaukee area, Plating Engineering Co., uses a method referred to as electro-nickel cladding in which the nickel surface provided by electroplating may be as heavy as that normally obtained by the rolled cladding process. A 3000-pound shaft processed by the company recently was plated to a very heavy depth, 0.200-inch per side, in three places before machining. The coating, it is reported, machines readily and grinding is unnecessary.

MODIFIED "LINE" TECHNIQUE—Instead of welding positioners, iron rails are used in the plant of Lintern Corp., Berea, O., to facilitate production line welding of large fuel tanks of the type used by heavy motor trucks. Rails are arranged so the tanks, fabricated in six stages, can be pushed from one welding booth to another as they move along the line. Top plates of the tanks consist of mild steel deck plate and bottoms and ends are 12-gage steel. In the production procedure, inner baffles and braces plus the bottom sections are first tack welded together. Side panels are then tacked on and final weldments made after all parts are assembled. Some 60 feet of welding electrode is required for each tank.

SHEET STORAGE TIP— Zinc-coated sheets can be stored for prolonged periods without injury to the Bonderized coating with only a few precautions, Armco Steel Corp., Middletown, O., reports. Most essential factor in successfully storing the metal is to keep it in a clean and dry place. Chemicals, especially salts, alkalies and acids should not be employed or stored in the same general area.

PROTECTS ALUMINUM AND ITS ALLOYS— Aluminum and its alloys, including those alloys containing copper as well as assemblies of alloys, now can be mirror-brightened and protected in a few minutes by a dip process developed by Technical Processes Division, Colonial Alloys Co., Philadelphia. According to the company, chemical control of the procedure is so simple that a chemist is not required, and much of the work, depending on the size and shape of parts, can be handled in bulk. As-fabricated parts, it is reported, often can be put through the short-cycle finishing sequence without prior polishing or buffing.

TO PARADE NEW MATERIALS—Many new materials will be shown for the first time during the twenty-second exposition of Chemical Industries scheduled for the Grand Central Palace, New York, Nov. 20 through Dec. 3. Among these is one referred to as Tanta-Clad which will be available for equipment construction. It consists of tantalum-surfaced nickel. Also on exhibit will be unpolished aluminum powders for use as fuel in jet-engines.

INCREASES PRODUCTION 75 PER CENT—Huge, high-speed triple action drawing press built recently by Lima-Hamilton Corp., Detroit, for stamping out automobile body tops is reported to increase production by some 75 per cent. The 600-ton unit flows steel sheet into the die at the rate of 70 feet per minute while operating at the rate of six strokes per minute. The stamped roofs come out of the die right side up rather than in upside down position, facilitating handling and eliminating danger of scratches.

PIG IRON SUBSTITUTE — Among methods of reducing ore to metallic iron, the Wiberg-Soderfors method is probably the one that employs the smallest quantity of reducing agent per ton of iron. It is capable of producing sponge iron at a price which makes it possible to consider the metal as a substitute for pig iron or scrap in steelmaking. The Swedish plant, which provides a rich sponge iron from certain poor ores otherwise difficult to concentrate, was first started in 1932 and reached its present form in 1941. Its performance between 1941 and 1945 is of interest to many following sponge iron developments. (p. 72)

FAST DRAWING—Dual die setup currently used in connection with a hydraulic press is enabling F. H. Lawson Co., Cincinnati, to turn out a complete steel cabinet body at each stroke of the press. By drawing, the one-piece body of 20-gage steel is made without seams at the rate of six per minute. Dies employed and action of the hydraulic press reduce scrap by making successful drawings even when steel quality is below specifications. (p. 76)

ELECTRODE ACTION — Type of coating used in a metal-arc welding electrode greatly influences penetrating characteristics of an electrode, it is pointed out. It also affects amount of heat affected zone, and in turn exerts considerable effect on metallurgical changes occurring in the base material and previously deposited weld beads. Physical properties of a weld may depend on composition of the core wire and certain constituents that may be added in the coating. And penetration depends to a great extent on current values employed as well as on manner the electrode is handled. (p. 78)

THE "WEATHER" TOUCH—In the blast furnace, most active ingredient of the blast is oxygen. It is needed to burn carbon in the coke and performs the functions of creating the necessary heat from the combustion to smelt and melt the iron, and of producing carbon monoxide to reduce the iron ore. Two important factors in the weather, however, influence blast furnace operations—temperature and relative humidity. (p. 88)

Wiberg-Soderfors Method For the MANUFACTURE

Procedure followed by a Swedish company is described for the first time. Reduction agent is almost completely utilized for reducing and heating the ore. Energy is supplied by combustion of some of the fuel by oxygen gas or oxygen-enriched air, thus obviating use of electric energy

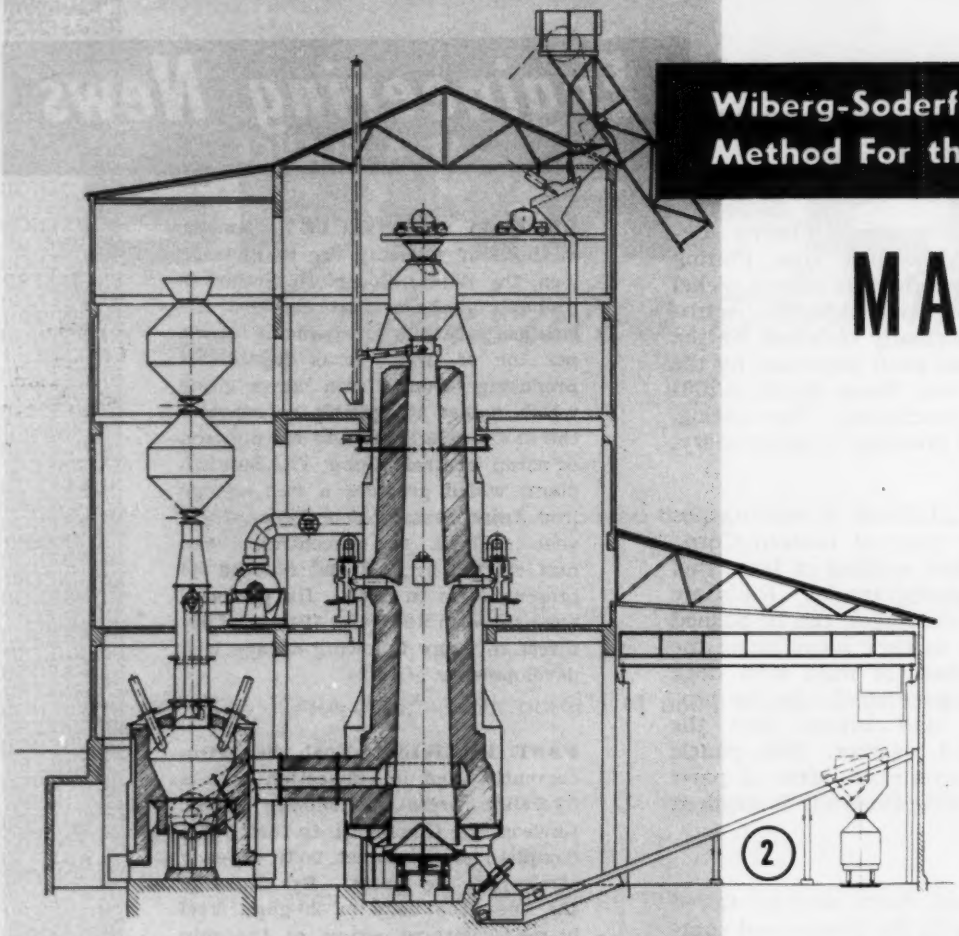
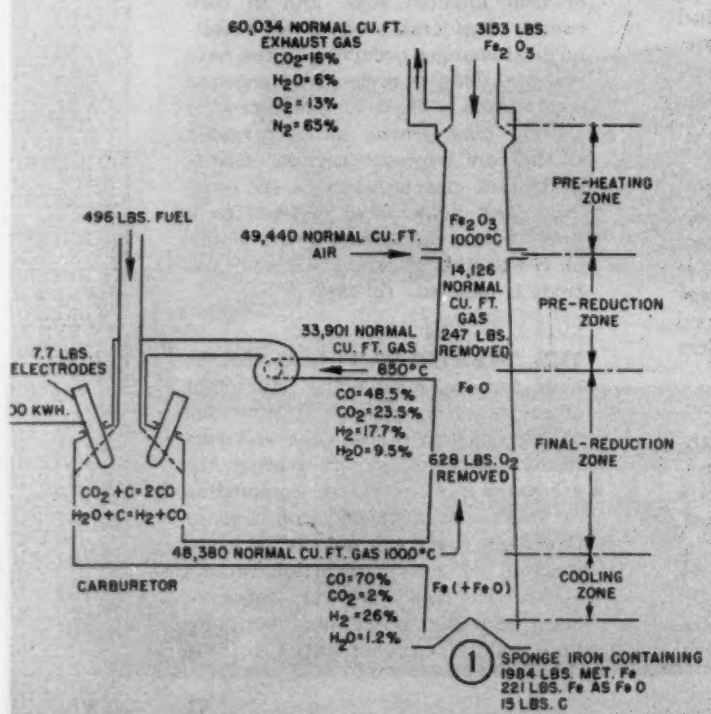


Fig. 1—Flow sheet of Wilberg-Soderfors sponge iron process

Fig. 2—Sponge iron plant of Soderfors

By BO KALLING and JOHN STALHED
Director of Research — *Supt. of Blast Furnace, Sponge Iron Plant*
Stora Kopparbergs Bergslags AB — Soderfors Steel Works, Sweden



METHODS of manufacturing sponge iron are of considerable interest at present in different countries. One of the main reasons is that sponge iron can now be produced at a price which makes it possible to consider this metal as a substitute for pig iron or scrap in steelmaking.

Conservation of fuel is a serious problem in many countries. Among all methods of reducing ore to metallic iron, the Wiberg-Soderfors method is probably the one using the smallest quantity of reducing agent per ton of iron.

Chemistry of the Process—Fig. 1 is a flow-sheet showing the process of manufacturing sponge iron containing 1 ton (2000 lb) Fe, with a 90 per cent degree of reduction, i.e., 1800 pounds metallic iron and 200 pounds of iron still in the form of oxides.

Ore is charged into the upper part of the shaft, the preheating zone. The gas rising through the shaft is burned by blowing air in excess into the shaft, thus preheating the ore to about 1850°F in this zone. At the same time sulphur in the ore is effectively removed. If the ore is magnetite (Fe_3O_4), it is oxidized more or less completely to Fe_2O_3.

In the prereduction zone the ore is reduced to FeO or rather, wustite with about 24 per cent O. This reaction is endothermic, and the temperature drops from 1850 to about 1550°F.

...OF SPONGE IRON

In the final reduction zone the ore meets an atmosphere containing about 70 per cent CO and 26 per cent H_2 and is reduced to metallic Fe according to the formulas,

$$FeO + CO = Fe + CO_2 + 4140 \text{ Btu/lb mol}$$
$$FeO + H_2 = Fe + H_2O - 14{,}600 \text{ Btu/lb mol}$$

The reaction heat of the first-mentioned reaction and the physical heat introduced with the gas, raise the temperature in the final reduction zone to about 1850°F.

During reduction, the iron takes up about 0.6 per cent C which is dissolved in the austenite and then occurs as cementite in the sponge iron.

In the lower part of the shaft the sponge iron is cooled to room temperature. When passing through the temperature range of 1200 to 800°F some further carbon is precipitated (about 0.1 per cent) in the sponge iron according to the formulae, $2\,CO = CO_2 + C$.

Gas necessary for the reaction is produced in the following way. Between the final and prereduction zone about 70 per cent of the ascending gas is taken out and led to the carburetor, where it is regenerated according to the formulas,

$$CO_2 + C = 2\,CO - 7900 \text{ Btu/lb mol}$$
$$H_2O + C = H_2 + CO - 51{,}500 \text{ Btu/lb mol}$$

Besides carbon, hydrogen in some form must be introduced in the carburetor in order to keep a constant hydrogen content. In Soderfors an electrically-heated charcoal carburetor is used, and the hydrogen is introduced in the form of fuel oil or, occasionally, water. Construction of the carburetor is described later.

The quantity and analysis of the gas shown in the flow-sheet are those occurring in practice. The theoretical fuel consumption per ton (2000 lb) Fe in sponge iron with a 90 per cent degree of reduction is 294 lb C and 18 lb H_2 under the circumstances stated.

Construction of the plant—The plant in Soderfors was first started in 1932. It reached its present form in 1941, as shown in Figs. 2 and 3. The design of the plant was to some extent influenced by the fact that it was built on a site where an old blast furnace was situated.

The shaft and carburetor are lined of high-quality firebrick and surrounded by a gas-proof, welded steel cover. The space between cover and brickwork is filled with Sil-O-Cel powder.

Ore to be reduced passes over an electrically-vibrated screen of Jeffrey-Trailor type, where the fine material under ⅝-inch is rejected. The ore then is tipped into the ore container on the top of the furnace, which takes ore for a 6-hour production.

Finished sponge iron discharged by a rugged, rotating discharging table, falls down into a gas-proof container connected with the furnace and holding a 2½-hour production. When full, it is emptied into closed stock-containers, which are used to transport the sponge iron to an electric steel furnace.

Charcoal is charged into the carburetor by two closed containers, each containing charcoal for about an 8-hour turn. Water or fluid fuel for regulating the hydrogen content in the gas is fed through a pipe in the center of the carburetor. A duplicate carburetor with charcoal container and fan is held in reserve.

Electric power is introduced by six Soderberg electrodes connected in pairs to three single-phase transformers, adjustable between 60 and 120 volts.

In the outlet for combustion gases in the upper part of the shaft there is an automatic valve, which keeps a constant positive pressure of 2½ psi water

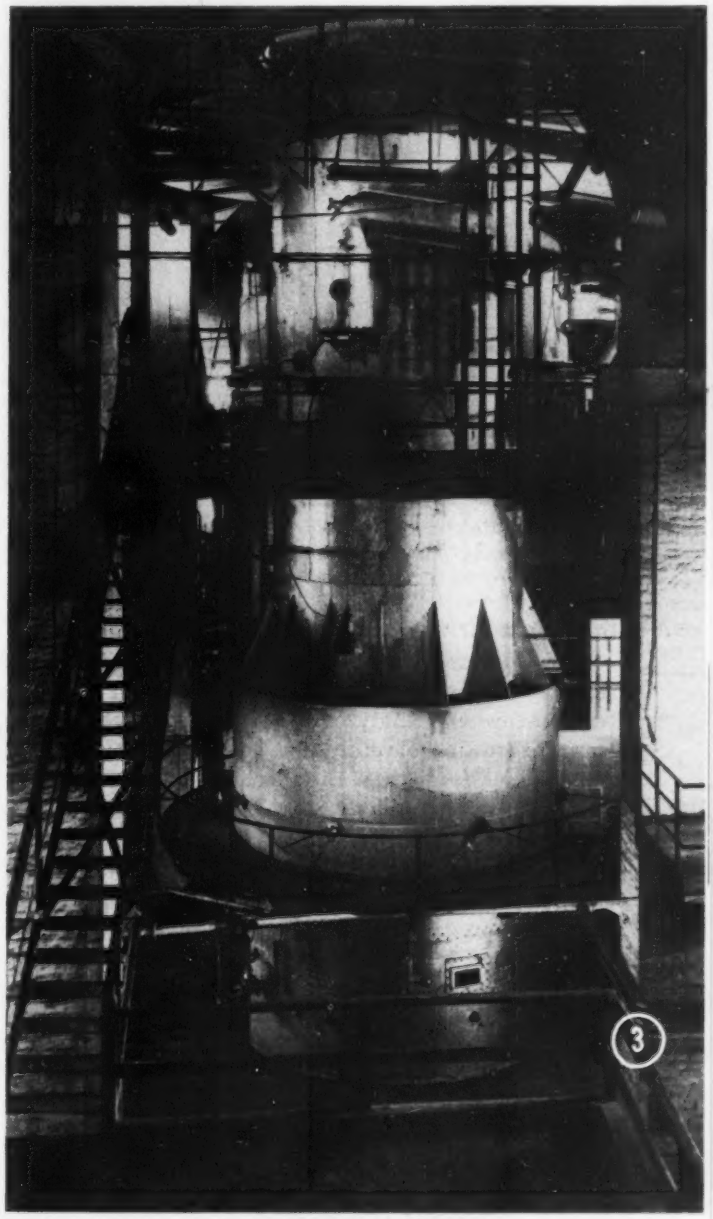


Fig. 3—Furnace shaft at Soderfors from base to gas withdrawal ports

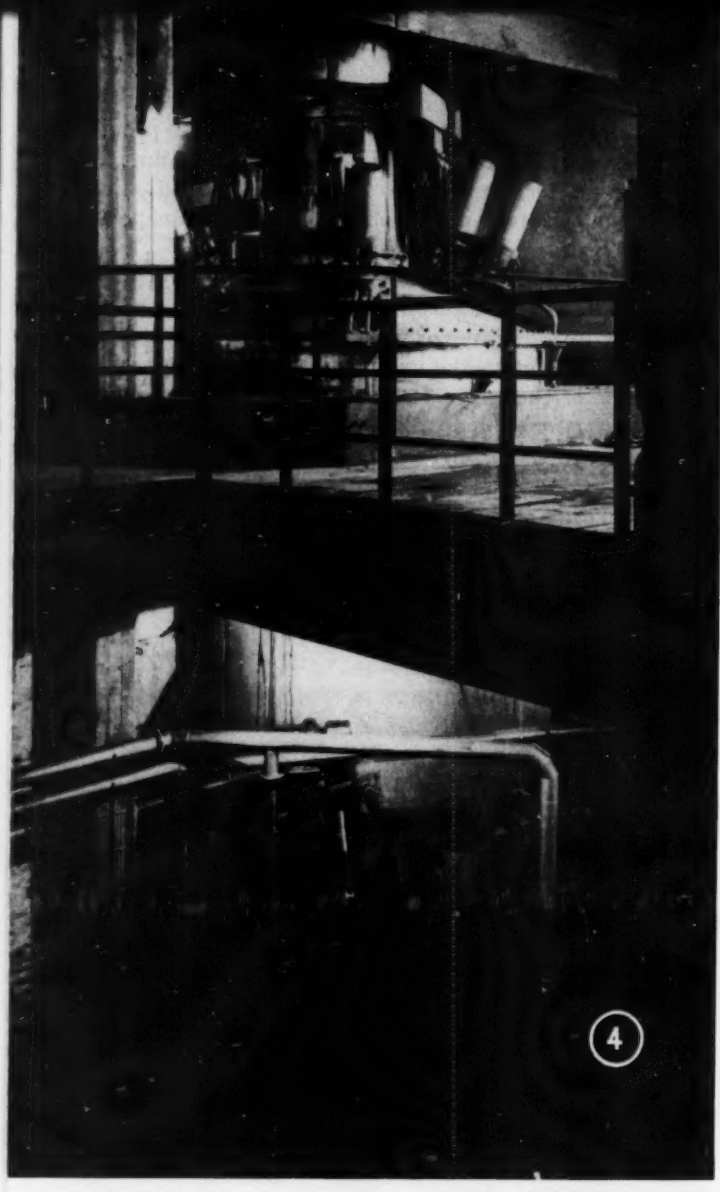


Fig. 4—Electric carburetor for regenerating spent reducing gas withdrawn from furnace shaft

to prevent air from entering the furnace.

Two Operators Involved—Operation of the furnace requires two men per shift. One operator controls temperature and analyzes the gas, adjusts the power, manages the carburetor, and lowers the electrodes; and his helper adjusts the discharge of sponge iron, empties the containers and takes samples of the sponge iron.

Production is adjusted by speed of the rotary discharge table. For a certain output a fixed quantity of gas is required. From the analysis of the gas before carburization it can be seen if the quantity is right. The CO_2 content should be about 26 per cent of the dry gas. Too high a CO_2 content indicates that the quantity of gas is too small, that reduction is poor. Too low a CO_2 content indicates too large a quantity of gas and consequently uneconomical operation. The gas quantity is adjusted by varying the number of revolutions of the fan.

Power to the carburetor is adjusted so that the reduction gas, fed to the shaft, is at the right temperature, 1850°F, and has a CO_2 content of about 2 per cent or lower.

Temperature and temperature distribution in the combustion zone are judged by putting an iron bar into the furnace through one of the feed pipes for air. After 5 minutes the bar is withdrawn and the temperature is judged by its color. This simple test proved perfectly satisfactory. Adjustment of temperature in the preheating zone is made by regulating the amount of gas burned in this zone by letting more or less gas escape from the pressure side of the fan. The process gives normally a certain slight excess of bled gas, which is not utilized either for reduction or preheating.

Reliability of the Method—The furnace has been in continuous operation since 1941, with only a couple of short interruptions for mechanical alterations and repairs. From Nov. 10, 1941 until Feb. 28, 1945 there was no interruption, and the same carburetor and fan were used during the whole period.

Hot gas fans did not cause any shutdowns. They worked at temperatures up to 1500°F and on an average at about 1125°F. One fan operated for more than 4 years. The shaft is to some extent worn by the falling charge above the combustion zone. The lower part of the shaft, built in 1932, shows no wear; it is covered by a 1-inch layer of sponge iron.

The carburetor operated for 3½ years without any damage to the brickwork. After that time it had to be changed because of a mechanical defect in the discharger.

After certain improvements in design of the mechanical equipment, the durability of the plant will be about 5 years. After that 6 weeks will be required to repair the brickwork in the preheating zone and the carburetor; and, time also will be required to overhaul the mechanical equipment.

During the earlier period of operation, which was largely experimental, the furnace charge occasionally stuck together. This conglomeration or clinkering was of two kinds; partly fusion of the ore in the preheating zone, partly welding of the reduced iron in the final reduction zone. Melting in the preheating zone may occur when using ores which contain a large quantity of fusible slag ingredients; this is relatively rare. Welding in the reduction zone may occur if the temperature is too high. There is no risk of such conglomeration in lump ores, which do not break or decrepitate during reduction, such as Kiruna A ore and Canadian steep rock ore. Ores and sinter having a tendency to disintegrate in the shaft, on the other hand, may cause tough conglomerations if the temperature is too high. With experience now gained this risk has been eliminated completely.

Operational Results—Average practice covering long periods of operation is as follows:

Sponge iron per day, tons	35
Average analysis:	
Metallic iron, %	64.9
Total iron, %	76.6
Reduction, %	84.2
Carbon, %	0.60
Sulphur, %	0.005
Phosphorus, %	0.015

Power consumption:

Per ton sponge iron, kwh	689
Per ton metallic iron, kwh	1060

Charcoal consumption:

Per ton sponge iron, lb	410
Per ton metallic iron, lb	630

Electrode consumption:

Per ton sponge iron, lb	6
Per ton metallic iron, lb	8.4

The low degree of reduction was determined by the fact that a high production was wanted. This degree of reduction proved satisfactory in melting the iron according to the practice developed in Soderfors. As shown later, there is no objection to increasing the degree of reduction, for instance to 95 per cent with suitable ores.

At the time the foregoing data were obtained, fluid fuel was not used for addition of hydrogen—only water. If fluid fuel had been used, the power consumption as well as the total fuel consumption would have been lower, as the carburization of water to $CO + H_2$ consumes both carbon and heat energy.

The reaction mainly determining the power consumption in this process is the reduction of FeO to Fe. It also appears that the power consumption per ton metallic Fe is a function only of the production of metallic Fe per unit of time, and is, within a certain range, independent of the Fe content and the degree of reduction of the sponge iron in question (Fig. 5). As can be seen, the power consumption in this furnace can be as low as 1000 kwh per ton metallic Fe. This figure should be still lower for a larger furnace with proportionately smaller losses from the carburetor and gas pipes.

Carburetor and gas pipes should be thoroughly heat insulated. The insulation of the final reduction zone is also important, for the better the insulation the higher the content of hydrogen which can be maintained in the reduction gas, thus yielding a higher production and lower power consumption. Insulation of the prereduction zone should be as effective as possible, because the temperature of gas fed into the carburetor then can be higher, thus saving power.

The theoretical minimum power consumption is 700 kwh per ton metallic Fe under the conditions indicated in the flow sheet, Fig. 1.

Suitability of Different Ores—The following properties of a suitable ore for the shaft furnace reduction are required:

1. The ore should be obtainable in plus ¾-inch to minus 3 inches. Larger pieces than 3 inches often proved insufficiently reduced in the center. Smaller pieces than ⅝-inch have a tendency to pass through the shaft faster than the rest of the charge and are therefore not so well reduced.
2. The ore should not disintegrate during heating and reduction, otherwise the gas circulation is impeded. It appears that this disintegration takes place before the FeO stage. To ascertain the firmness of a certain kind of ore or sinter, it is only necessary to reduce a sample to FeO (Wustite) and compare it with other ores, the behavior of which is known. If the FeO substance is sufficiently hard, the ore can be charged into the furnace without any risk.
4. The ore should be porous in order to obtain rapid reduction. The more porous the ore, the larger the pieces that can be accepted. (*Please turn to Page* 102)

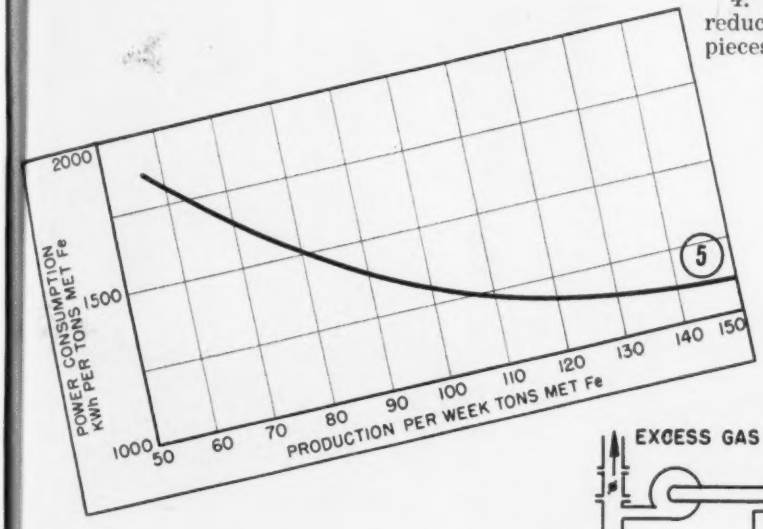


Fig. 5—Power consumption plotted against production of metallic iron

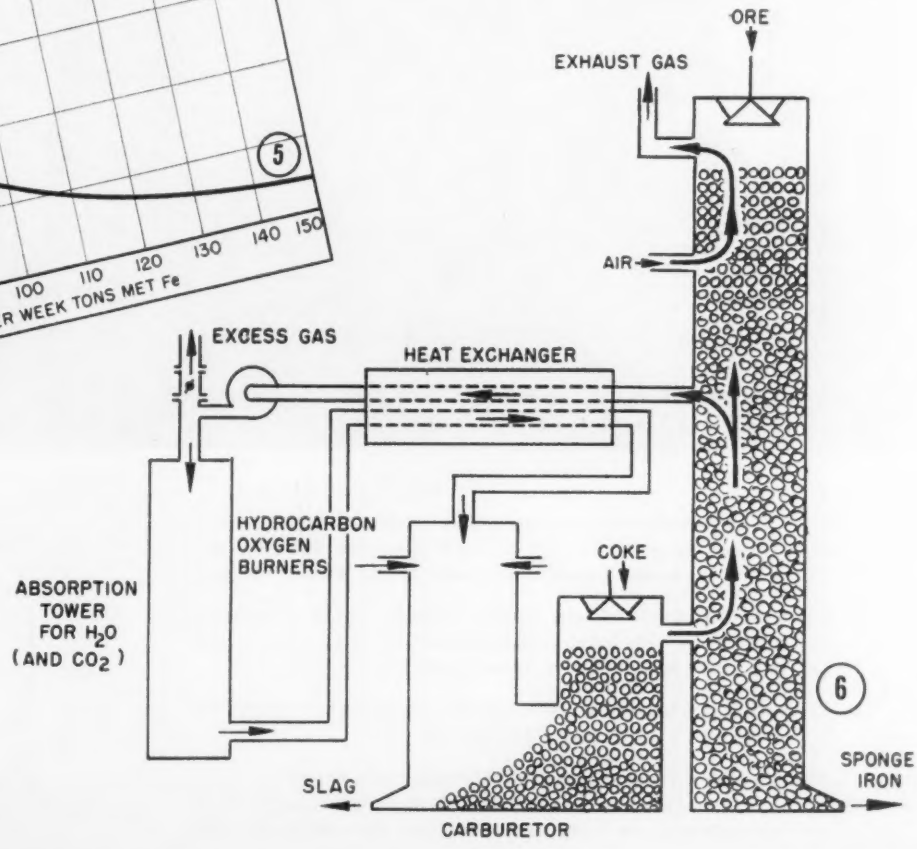


Fig. 6 — Schematic diagram of Wilberg-Soderfors process driven with oxygen

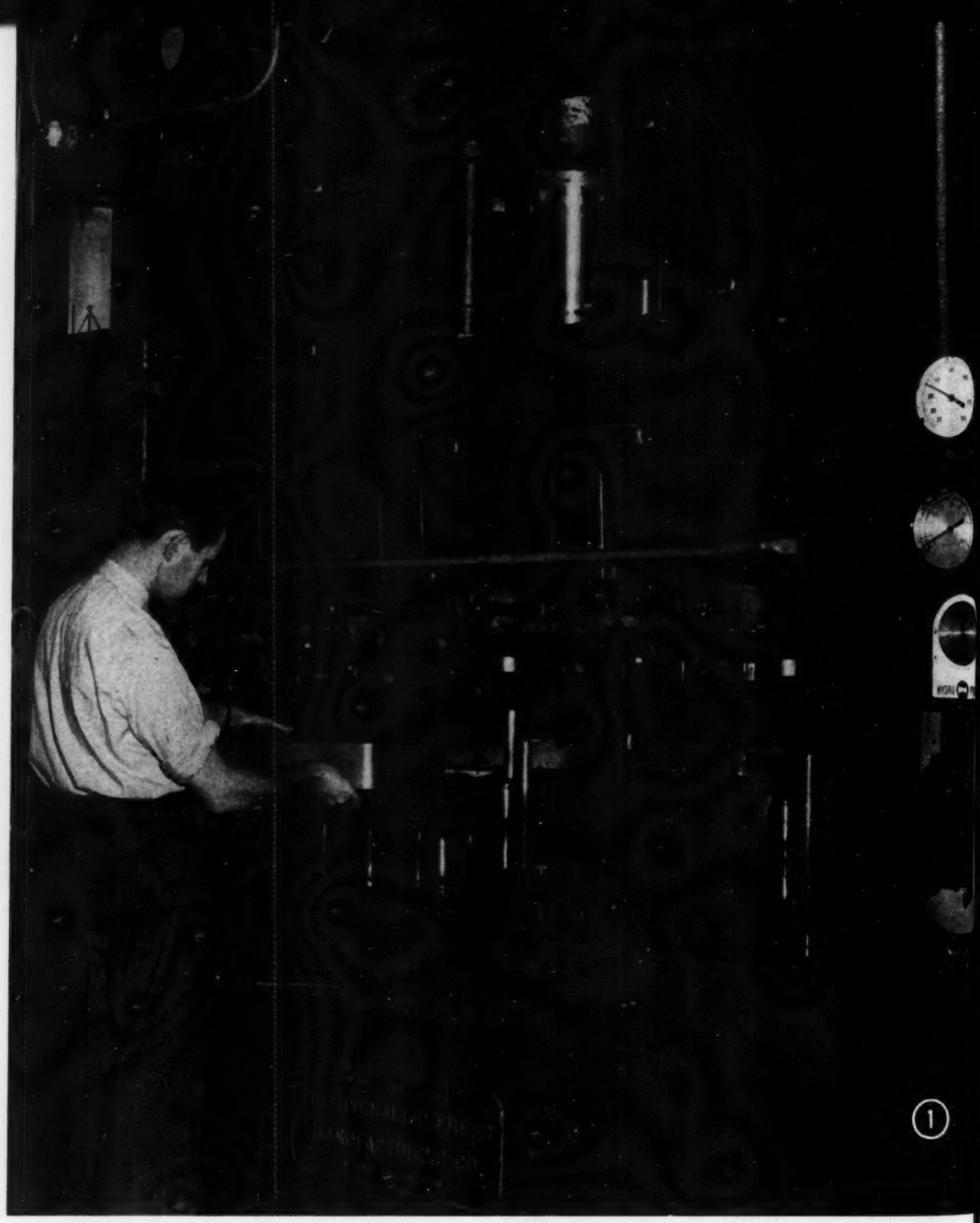
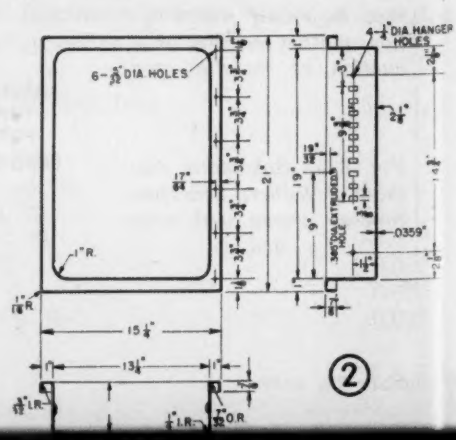


Fig. 1—Hydraulic press setup for deep drawing cabinet bodies from 20-gage steel. Die, left, does the drawing and die at right trims drawn part and forms return flanges

Fig. 2—Drawing showing typical cabinet body measuring 13¼ x 21 inches inside dimensions. Return flanges are formed in same die that trims flash from drawn part

Fig. 3—Sectional drawing indicating operation of trimming and flanging die

Fig. 4—Blank from which cabinet bodies are drawn is shown at top left and drawn body at lower left. Two cabinets, right, as they appear from front and rear after trimming operation is completed



By HERBERT CHASE
and
C. M. LUMLEY
Superintendent
F. H. Lawson Co.
Cincinnati

DUAL DIE SETUP

. . . completes steel cabinet body at each press stroke

SUBSTANTIAL scrap reduction, improved product quality without sarcifice of rapid production rate is the net result of F. H. Lawson Co.'s experience with a hydraulic type press which is providing a complete bathroom cabinet body at each stroke.

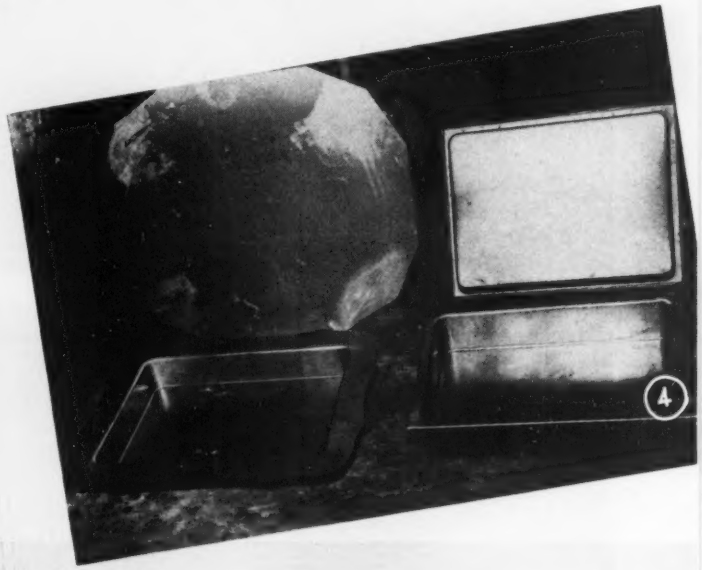
Major component of the cabinets currently manufactured by the Cincinnati firm is a one-piece body drawn from 20-gage steel. By drawing, it is made without seams at the rate of six per minute. The cabinet bodies are made by the company in four standard sizes with inside measurements of 13½ to 15¾ inches wide, 17¾ to 23¼ inches high and 4¼ inches deep. They include adjustable stainless steel clips to support shelves and a return flange on four sides forming a channel for wiring to meet underwriter specifications. They also are produced with rounded interior corners as shown in the drawing Fig. 2.

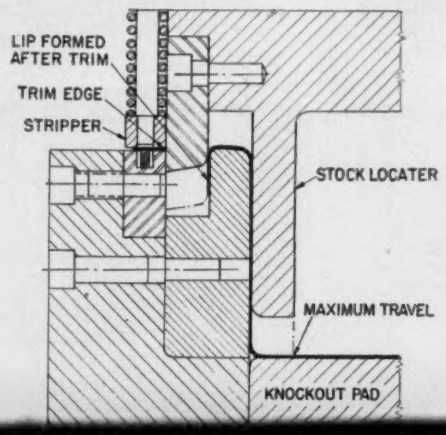
Scrap Losses High—Until recently, bodies of the cabinet were drawn and flanged in two older type presses. But harmonic motion of the ram in these units resulted in striking the metal a blow at high velocity and tended to produce high scrap losses from tearing, especially when steel quality was not up to specification. In addition, if gage ran too high, or two blanks happened to be inserted at the same time, there was danger of die or press breakage.

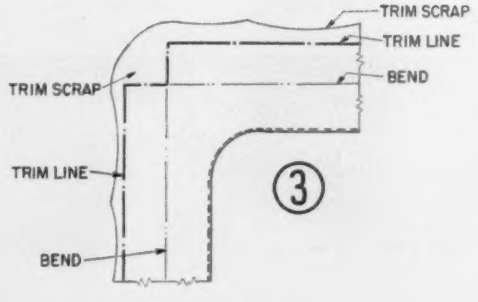
To make continuous production runs on the cabinet bodies, two of the largest of these type presses were required. The drawing operation was done in the first press, and trimming plus forming of the return flanges in the second, with handling between.

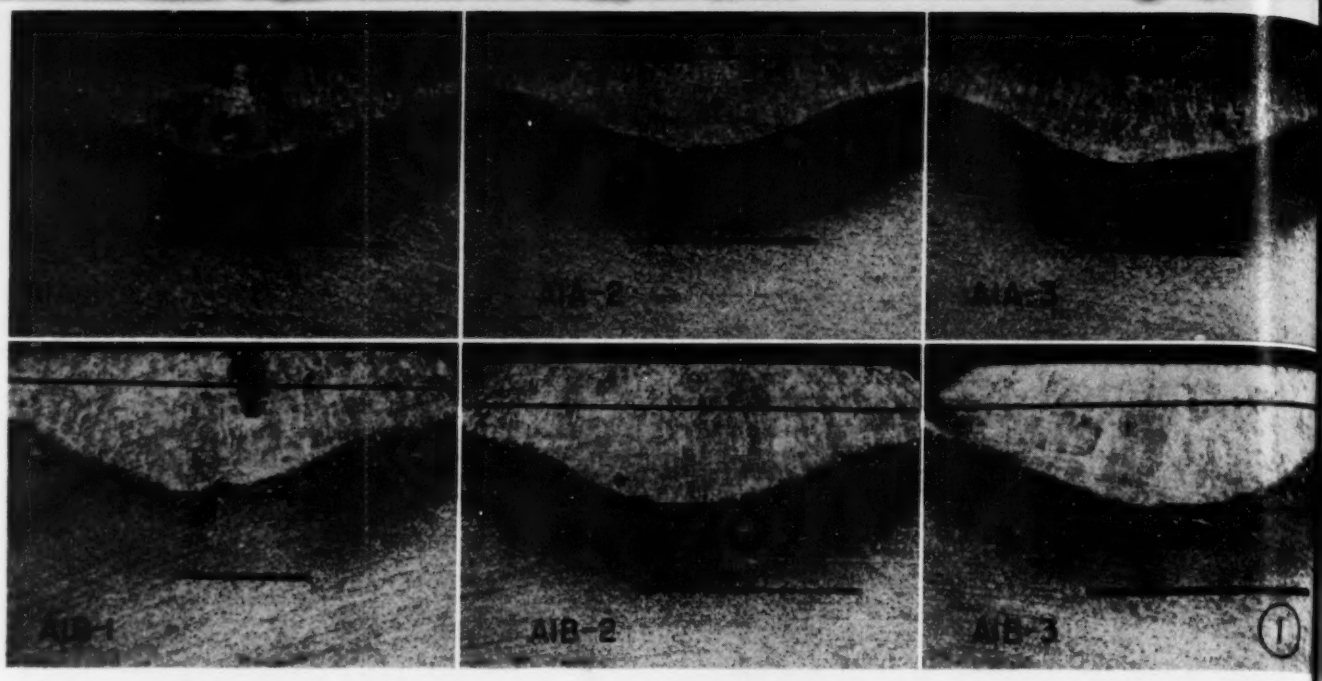
In an attempt to improve product quality and to reduce scrap losses and possible damage to equipment, the company recently installed a 250-ton, fast traverse hydraulic press to process the cabinet bodies. A self-contained all-hydraulic unit, it is a single-action type equipped with two 50-ton hydraulic die cushions located in the press bed. Each of the die cushion platens is 37 x 32 inches, with 12-inch stroke.

Fast Draw Speed—The press, manufactured by Hydraulic Press Mfg. Co., Mount Gilead, O., is equipped with a closed circuit hydraulic operating system. It closes and returns at 835 inches per minute and, under full load, will actually draw metal at a rate of 140 inches per minute. It reverses whenever a predetermined pressure is reached or at a predetermined position of the press slide. A 100-horsepower electric motor drives the hydraulic pump, although maximum power is not required for all phases of the press cycle. This press, though occupying little more space than one of the previous units, is large enough to accommodate and (*Please turn to page* 108)





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A1A-3
A1B-1
A1B-2
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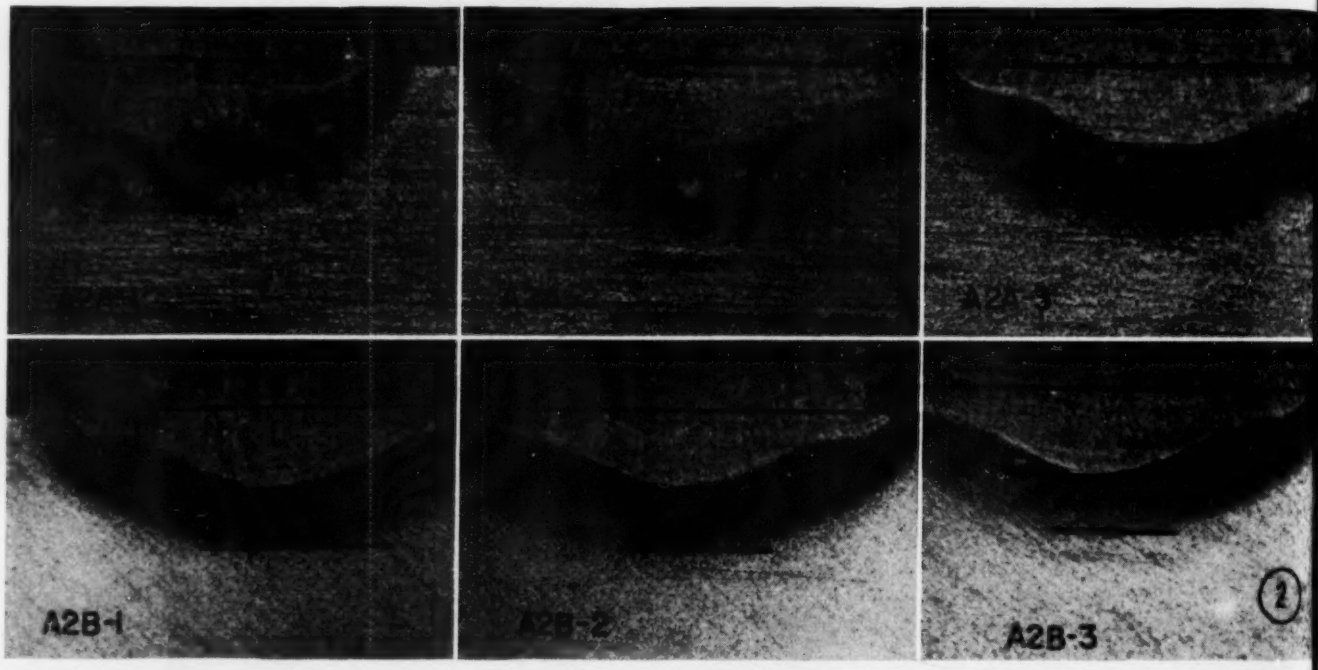
1


A2A-3
A2B-1
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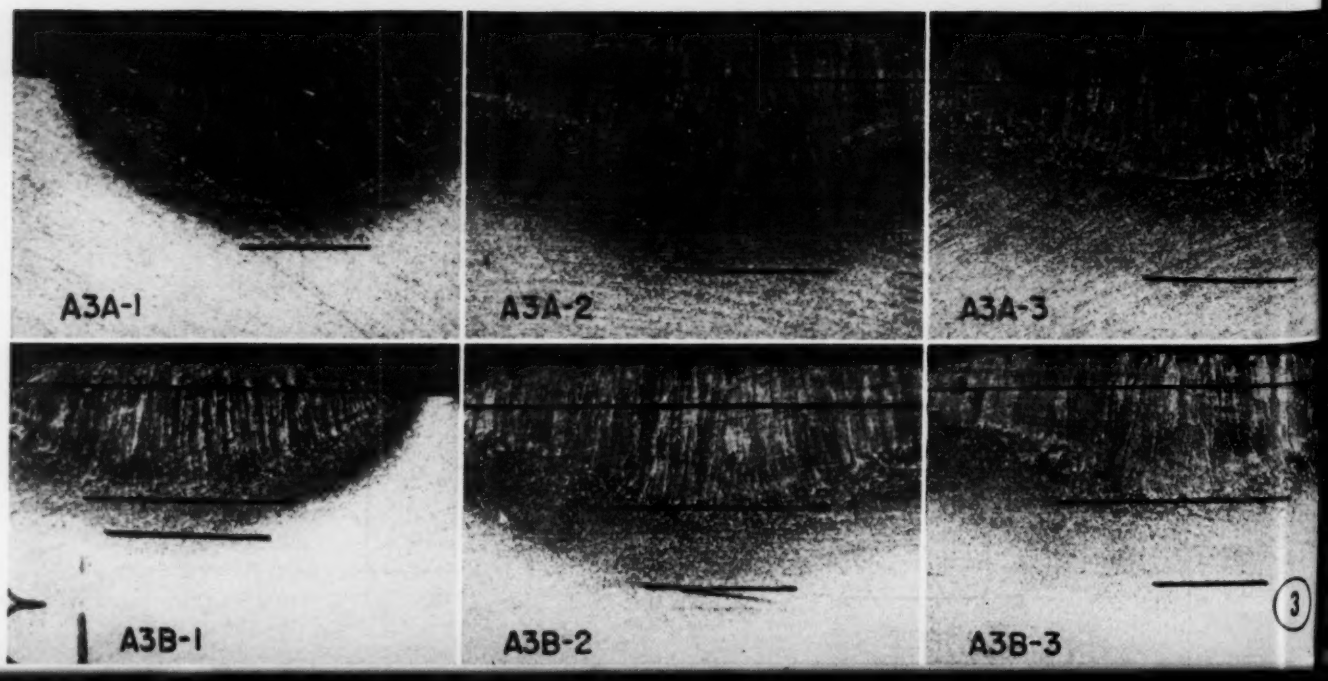
2


A3A-1
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3

Operating Characteristics

Of Arc Welding Electrodes

Incidental factors besides the human element have considerable effect on electrode operation and cost. To determine operating quality of different brands available, tests must be conducted as close to indentical conditions as possible

By F. W. MYERS JR.
Welding Engineer

DEVELOPMENT of welding electrodes is an interesting one—one that would take pages to cover properly from its historic beginning in 1881. It is interesting to note that the first covered electrode was made in Sweden in 1908 by Kelborg. From 1890 to 1910 the development was almost entirely in Germany.

In 1912 an asbestos coated electrode was produced in England. Further development of coated electrodes was almost entirely in European countries during the twenties. It was not until 1935-36 that covered electrodes were accepted and widely used for general constructional purposes in United States. Since then, covered electrodes were developed to the extent where they replaced entirely bare electrodes, with the exception of special jobs where the use of a covered type electrode would not be practical.

Coatings have developed from the early asbestos types, through the chalk, graphite and sodium silicate types, to the widely used lime and fluorspar types, and the new ferritic coated electrode presently finding wide usage and acceptance in the steel industry.

Double Function—Various constituent elements of an electrode coating act first as a slag forming material to control the weld contour and protect the molten metal from nitrogen pick-up, and second as cellulosic materials which act as a deoxiders and arc stabilizers. In addition other elements are added to coating for specific purposes. In some cases alloying

Fig. 1—*A1A*-1, *Penetration, inches* 0.103, *heat affected zone,* 0.087; *A1A*-2, *penet., inches* 0.096, *HAZ* 0.090; *A1A*-3, *penet., inches* 0.106, *HAZ* 0.087; *A1B*-1, *penet., inches* 0.112, *HAZ* 0.081; *A1B*-2, *penet., inches* 0.100, *HAZ* 0.084; *A1B*-3, *penet., inches* 0.106, *HAZ* 0.081

Fig. 2—*A2A*-1, *penetration, inches* 0.087, *heat affected zone* 0.065; *A2A*-2, *penet., inches* 0.090, *HAZ* 0.053; *A2A*-3, *penet., inches* 0.087, *HAZ* 0.065; *A2B*-1, *penet., inches* 0.081; *HAZ* 0.056; *A2B*-2, *penet., inches* 0.075, *HAZ* 0.059; *A2B*-3, *penet., inches* 0.087, *HAZ* 0.053

Fig. 3—*A3A*-1, *penetration, inches* 0.134, *heat affected zone* 0.046; *A3A*-2, *penet., inches* 0.109, *HAZ* 0.084; *A3A*-3, *penet., inches* 0.106, *HAZ* 0.096; *A3B*-1, *penet., inches* 0.109, *HAZ* 0.046; *A3B*-2, *penet., inches* 0.100, *HAZ* 0.084; *A3B*-3, *penet., inches* 0.115, *HAZ* 0.090

Fig. 4—*A4A*-1, *penetration, inches* 0.109, *heat affected zone* 0.071; *A4A*-2, *penet., inches* 0.103, *HAZ* 0.078; *A4A*-3, *penet., inches* 0.090, *HAZ* 0.096; *A4B*-1, *penet., inches* 0.090, *HAZ* 0.090; *A4B*-2, *penet., inches* 0.090, *HAZ* 0.090; *A4B*-3, *penet., inches* 0.075, *HAZ* 0.096

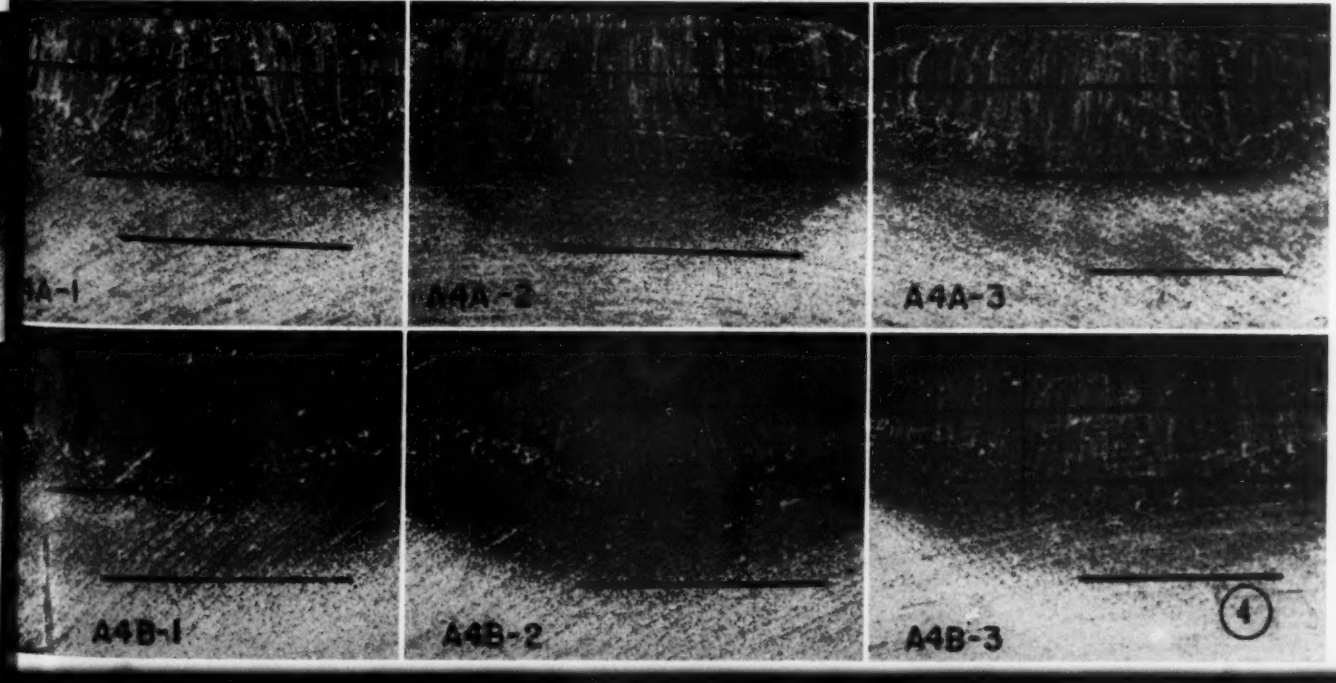
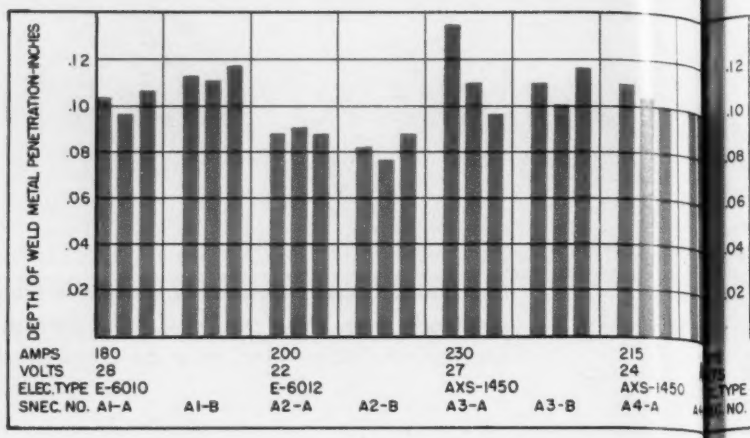


Fig. 5—Graph A indicates weld penetration of three types of electrodes tested. Graph B shows measurements of depth of heat-affected zones for the three electrodes

Fig. 6—Diagrammatical presentation of how weld metal deposition increases with increase in current values. Solid line, AWS class E-6020; dotted line, AWS class E-6010. Taken from AWS welding handbook, 1942 edition

Fig. 7—Weld beads illustrate effect of varied current on weld deposit. Bead 1, insufficient current with lack of penetration; bead 2, extremely high current with excessive penetration; bead 3, proper current values resulting in proper penetration



materials are induced into the weld deposit through the coating.

An exact distinction between brands and types of electrodes on basis of their operating characteristics is far from being an easy task. Only practical tests enable an engineer, supervisor or operator to obtain a true picture of these properties. Incidental factors as well as the human element add considerable effect on electrode operation and test. The striking of the arc, and the stability of the metal flow depend not only on the constituent elements of the electrode and the electrode manufacturing process, but also on the shape and composition of the base material. Thus, tests used to determine the operating quality of different brands of electrodes, must be carried out as far as possible under identical conditions.

Steady Metal Flow Important—Transfer of filler metal from welding electrode to the pool of molten weld metal, should take place in an even, steady flow, with a stable arc so that the filler metal transfers in form of small metal particles at uniform rates of deposition, without excessive spatter loss. As spatter loss primarily depends upon arc length and composition of electrode covering, considerable attention must be given to arc conditions under which each electrode operates most smoothly for comparing different classes of electrodes on a basis of filler metal transfer or filler metal deposition. Generally, form of filler metal transfer may be determined by careful observation of the welding arc, as the welding operation progresses. Because of these factors, it is usually desirable to use some type of mechanical electrode feeding device for testing electrode operating characteristics. This largely eliminates the human element from the welding operation, and attention of the welding operator can be primarily directed toward observation of the phenomenon of filler metal transfer of the electrode under test.

Factors Affecting Weld Deposit—Properties of the weld deposit depend not only on type of electrode used, but also on other factors. For example, manner in which the weld is made. An unskilled welding operator will not obtain the best results even if he uses the most suitable electrodes. Additional factors which should be considered in evaluating a welding electrode are as follows:

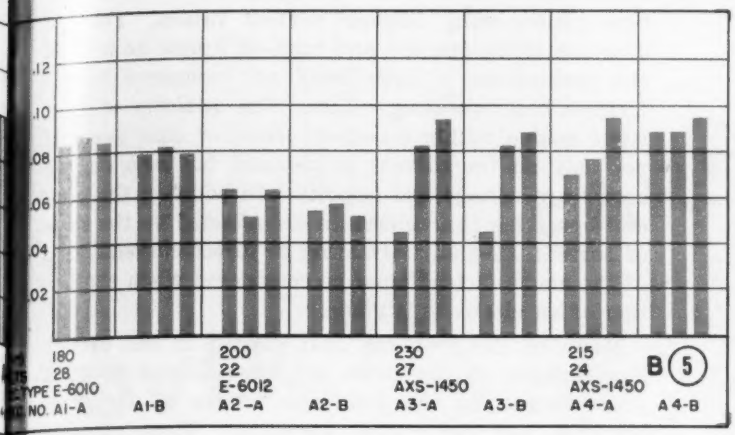
Manipulation of the electrode, control of the slag, length of arc, correct current values, and proper polarity. It must be remembered that there are differences between properties of the electrode materials, base metal and the final weld metal in the completed joint. The weld metal is a mixture of electrode metal and base metal. Its resulting microstructure is influenced by several factors of electrode composition, base metal composition, joint geometry and welding technique, all of which are involved in the procedure used in depositing weld metal.

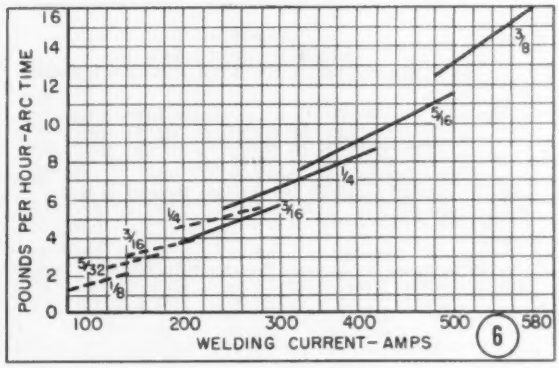
E-6010 and E-6012 Type Coatings—These electrodes represent classes intermediate to what were formerly known as "wash-coated" and "heavily-coated" types. They made possible relatively high-strength welds without greatly increasing cost over the so-called "wash-coated" types. The AWS E-6010 and E-6012 electrodes are considered general purpose types and are widely used in industry. The coating of the E-6010 type electrode is commonly classified as the "cellulosic" type, chiefly because it contains large quantities of cellulose. Slag forming constituents such as titanium dioxide and various types of silicates are also present in electrode coatings. Coating of the E-6012 type electrode is usually referred to as the "rutile" type. Titanium oxide is the main slagging ingredient in this type. Other siliceous materials also are used for slag forming.

It should be understood clearly that the type of coating used in a metal-arc welding electrode greatly influences penetrating characteristics of an electrode. Type of coating also affects amount of heat-affected zone. This in turn has considerable effect on metallurgical changes occurring in the base material and previously deposited weld beads. The physical properties of a weld made with these two classes of electrodes also will depend on the composition of the core wire and certain constituents that may be added in the coating.

Penetration Characteristics—It is usually difficult to determine the penetration characteristics of an electrode, as this depends to a great extent on current values used, as well as on manner in which the electrode is operated. Comparative welding tests for each electrode brand should be carried out under identical conditions. One method which may be used in conducting experiments in conjunction with this evaluation is as follows:

Single beads should be run on a low carbon test-plate under similar conditions using a mechanical





electrode feeding device. After beads are deposited, the test plate is sectioned and faces of the section are etched. Then depth of penetration and heat affected zone can be easily measured. Note Fig. 1.

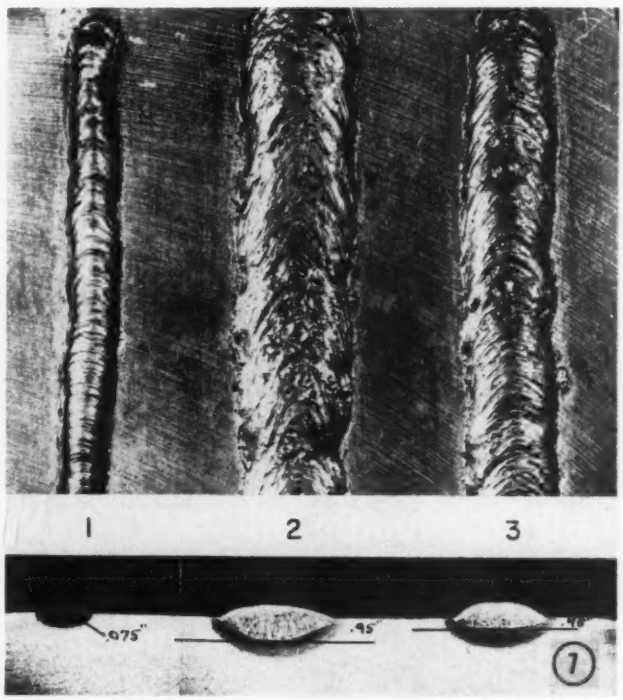
General operating factors such as amperes, volts, time for deposit, etc., for the illustrations are tabulated in Table I. In Table II the melting rate, deposition rate, and deposition efficiency calculated for the electrodes tested are given.

Photomacrographs of the various test specimens made for this experiment are shown in Figs. 1 to 4. These photomacrographs show quite clearly the weld bead contour, depth of penetration, and the width of heat-affected zone of the three classes of electrodes tested. Penetration and heat-affected zone measurements were taken from the photomacrographs and are given in Table III.

In graph 1, Fig. 5, the weld penetration of the three types of electrodes tested is shown. The weld bead tests, from which the data used in graphs 1 and 2 were taken, were made using the optimum current value for each type and brand of electrode. (These values were obtained after many preliminary experiments were conducted.) Graph 1 shows quite clearly that an AWS class E-6010 gives considerably more penetration than an E-6012 electrode, even though the E-6012 electrode is used with a current value 20 amperes higher.

The weld penetrating characteristics of the E-10025 electrode are generally comparable to the E-6010 electrode. This is taking into consideration that the high strength electrodes were tested with higher current values and the actual penetration shown on the graph is higher than those values used with the E-6010 electrodes. It should be noted, that electrode penetrating characteristics are not as uniform as those of the class E-6010 electrodes. This is because the AXS-1450 electrode has a higher moisture content in the coating than the E-6010 electrode type. As the electrode is consumed this moisture is rapidly evaporated, and the actual penetrating ability is lessened to a certain extent in varying degree.

In graph 2, Fig. 5, the measurements of depth of the heat-affected zones are shown for the three types of electrodes tested. These measurements of the heat-affected zone were made below the weld metal deposit. When graph 1 is compared with graph 2 it can be seen that as weld bead penetration is increased



depth of heat affected zone decreases. As penetration decreases, depth of heat affected zone increases. This phenomenon holds true for the three types of electrodes tested.

From this example, it can be seen that previously accepted theory of weld metal penetration and depth of heat-affected zone increasing and decreasing together is basically incorrect. Actually, from results shown in graphs 1 and 2, it can be stated that, with the electrodes tested, the opposite is true. This factor should be considered when a weld is to be made, where it is necessary or advisable to limit the area of heat-affected zone—either for metallurgical or mechanical reasons.

Weld beads shown in Fig. 7 were made with different current values using the same travel speed and illustrate clearly the effect of varied current upon the weld deposit. The first bead shows a weld made with insufficient current. The second shows the effect of extremely high current, resulting in excessive penetration. The third, made with proper current values, and the same travel speed, results in good penetration and appearance.

Deposition Rates—If we compare the weight of the

TABLE I
WELDING TEST DATA
3/16" DIAMETER DC REVERSE POLARITY E-6010

Plate No.	Weight Oz.		Arc Volts	Amp.	Time Sec.	Stub
A-1	After Welding 3#	9.7344	28	180	56 3/5	5 1/8"
	Before Welding 3#	6.9532	28	180	54	5 1/4"
	Oz. deposited	2.7812	28	180	54 3/5	5 1/8"
3/16" Diameter DC Straight Polarity E-6012						
A-2	After Welding 3#	8.6407	22	200	44 3/5	6 5/16"
	Before Welding 3#	6.2344	23	200	41 4/5	6 7/8"
	Oz. deposited	2.4063	22	200	43	6 5/16"
3/16" Diameter DC Reverse Polarity E-10025 (AWS Tentative)						
A-3	After Welding 3#	7.4844	27	230	53	4"
	Before Welding 3#	4.4688	26	240	51	4 1/2"
	Oz. deposited	3.0156	26	235	40	7 3/8"
3/16" Diameter DC Reverse Polarity E-10025 (AWS Tentative)						
A-4	After Welding 3#	8.5782	24	215	60 1/5	3 3/8"
	Before Welding 3#	4.6094	24	215	60 1/5	3 3/8"
	Oz. deposited	3.9688	24	215	60 1/5	3 5/16"

TABLE II
MELTING RATE

Plate No.	Stub	In. Melted	Time In/Sec.	Melting Rate In./Min
A-1	15 1/2	27 1/2	164.8	10.01
A-2	19 1/2	22 1/2	129.2	10.45
A-3	16 3/8	25 3/8	140	10.72
A-4	10 1/16	31 1/16	180.6	10.58

Deposition Rate

Plate No.	Oz. Deposited	Time/Sec.	Deposition Rate Oz./Hr.
A-1	2.7812	164.8	50.73
A-2	2.4063	129.2	67.03
A-3	3.0156	140	77.54
A-4	3.9688	180.6	79.09

Deposition Efficiency

Plate No.	In. Melted	Oz. Melted	Oz. Deposited	% Deposition Efficiency
A-1	27 1/2	3.80	2.7812	73.2
A-2	22 1/2	3.04	2.4063	79.1
A-3	25 3/8	4.10	3.0156	73.6
A-4	31 1/16	5.06	3.9688	78.4

TABLE III
MEASUREMENTS OF DEPTH OF PENETRATION AND HEAT-AFFECTED ZONE IN WELD SPECIMENS

Weld Specimen Number	Penetration Inches	Depth Inches Heat-Affected Zone*
A1A-1	0.103	0.087
-2	0.096	0.090
-3	0.106	0.087
A1B-1	0.112	0.031
-2	0.100	0.084
-3	0.106	0.081
A2A-1	0.087	0.065
-2	0.090	0.053
-3	0.087	0.065
A2B-1	0.081	0.056
-2	0.075	0.059
-3	0.087	0.053
A3A-1	0.134	0.046
-2	0.109	0.084
-3	0.196	0.096
A3B-1	0.109	0.046
-2	0.100	0.084
-3	0.115	0.090
A4A-1	0.109	0.071
-2	0.103	0.078
-3	0.090	0.096
A4B-1	0.090	0.090
-2	0.090	0.090
-3	0.075	0.096

* Below weld metal.

electrode melted within a given space of time with current values used during the same period, we find that the weld metal deposition increases with an increase in current values. Fig. 6 gives a diagrammatical representation of this. Within limits of the current values used most frequently in production, this increase of weld metal deposition with an increase in current values will be proportionate. In testing electrodes, it is good practice to ascertain by means of welding tests the highest current values advisable for each type of electrode used. This was done in tests conducted with the electrodes used in this experiment.

In most cases, the following procedure proves sufficiently conclusive. Several beads are deposited on base plates, using different current values. The arc characteristics, spatter, and burn-off losses, as well as the penetration of each bead, are compared to determine best operating values. The quantity of electrode melted within a certain period of time depends not only on the current adjustment but also on the actual arc voltage and polarity. In addition the general operating characteristics are affected by the type of current, that is, alternating or direct current. All of the above factors must be considered when evaluation of an electrode is made.

Many of the problems that existed in the proper classification of electrodes are now cleared up to a great extent by the combined efforts of technical societies and interested agencies. These groups through their committees have prepared welding electrode specifications that cover the most common commercial brands of electrodes in use today.

The continuous research, and development of electrode coatings by electrode manufacturers is undoubtedly the most significant factor contributing to the widespread use and acceptance of metal-arc welding by the various metal industries.

As is well known, one of the primary reasons for the development of shielded-arc electrodes was to make possible the deposition of weld metal with physical properties which would be similar to those of the base materials to be welded. With bare and lightly-coated electrodes this was generally impossible. Electrode development has progressed to the point where it is now possible to procure commercially many grades and types of covered electrodes for welding materials which formerly were considered impractical to weld. This includes special types of high-strength steels, nonferrous materials and special heat resistant alloys.

When test and selection of electrodes are made, the following factors should be considered:

Does the electrode have suitable operating characteristics?

Can the electrode be used with ac or dc welding current?

Will the weld bead deposit have the required physical properties and meet required specification requirement?

Will the electrode be suitable for different welding positions which may be encountered?

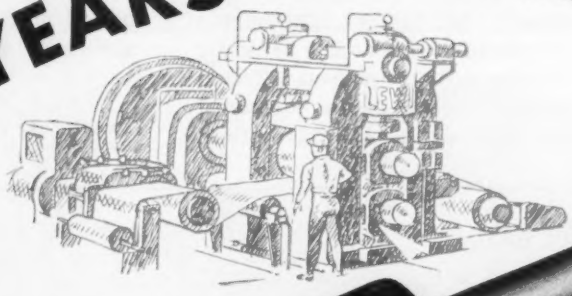
Is cost of the particular electrode excessively high for economical production?

Is the electrode coating especially susceptible to moisture pick-up and exposure to varied atmospheric conditions?

To make an extensive and complete analysis of commercially available electrodes it would be necessary to conduct a number of experiments with brands representing all the various AWS electrode classifications and also with different manufacturers' brands. Such factors as arc voltage, arc length, travel speed and others are extremely important in an evaluation of this sort and must be given careful analysis before final conclusions are drawn in the comparison and evaluation of arc welding electrodes with reference to penetrating and operating characteristics.

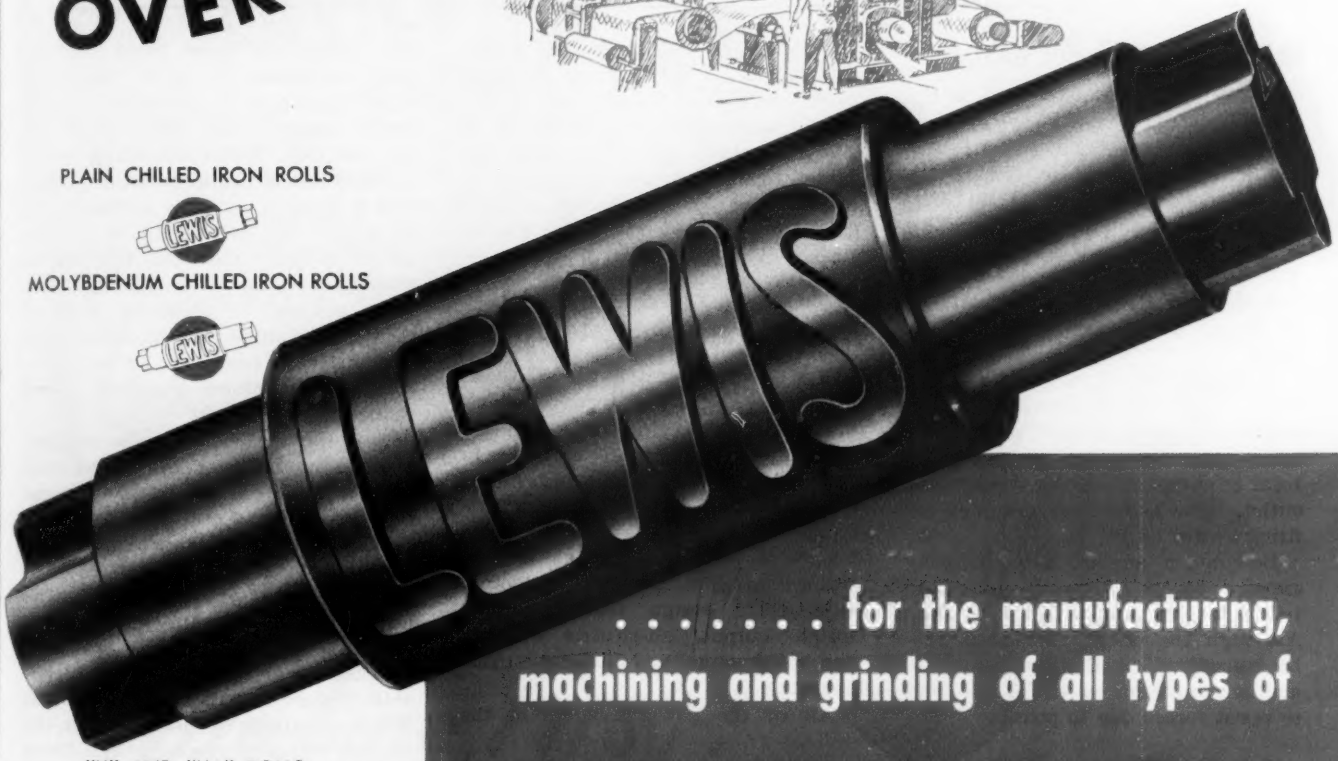
Problems of correct electrode classification by tests of operating characteristics were aided considerably

OVER 90 YEARS EXPERIENCE



PLAIN CHILLED IRON ROLLS

MOLYBDENUM CHILLED IRON ROLLS



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(Alloy Grain Type)

SUPERIOR "X" ROLLS
(Nickel Grain Type)

SPECIAL PROCESS ROLLS
(Chill and Grain Type)

ATLAS AND ATLAS "B" ROLLS
(Alloy Grain Type)

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by the preparation of welding electrode specifications. Now most common commercial electrode classes are covered by specifications. In case of special purpose electrodes, the user usually draws up specification requirements which aid proper classification by their operating characteristics.

It is considered necessary that further experiments and tests of the type discussed in this article be made, especially comparative penetration and heat affected zone tests. These experiments should be conducted by disinterested testing agencies such as the National Bureau of Standards, and other nonprofit organizations so that a more complete and comprehensive knowledge of electrode behavior is available to the steel fabricator, welding engineer, welding supervisor and welding operator. A more extensive understanding of electrode operation and possible uses will permit more advantageous use of welding by the metalworking industry.

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166th Outdoor Boiler Built

OUTDOOR boiler unit No. 166 is the last of seven new radiant type boilers installed at the Redondo Beach, California, steam station of the Southern California Edison Co., by Babcock & Wilcox Co. of New York. The seven boilers at the $38-million plant will supply steam to four main steam turbine generators, each developing 66,000 kw and two 6000 kw auxiliary units.

Designed for 1000 psi working pressure, each boiler has a maximum steam output of 440,000 pounds per hour, operating at 875 psi and 900°F total temperature at the superheater outlet. The boilers are designed for firing by gas or oil.

Boilers are installed outdoors, fully exposed to the elements and rising to the height of a six-story building. Although the effect of wind had to be considered in the boiler design, another provision called for planning to resist forces due to possible earthquakes. The steel supporting structure, designed by Stone & Webster Engineering Corp., is designed to carry the calculated horizontal forces of an earthquake to the foundation. Water for cooling the condensers is drawn through two concrete tunnels extending 1900 feet into the Pacific Ocean.

Machine Forms Intricate Bends

FORMING of garnished and reveal moldings for car and truck windows in the automobile industry are the applications of the first machines in a new line of power benders designed by Hancock Tool & Die Corp., Detroit. Machines will form intricate bends in metal moldings, tubes, frames, etc., at a high production rate, their design featuring high torque output, all-electric controls and both manual and automatic cycle operation.

All of the power benders in the line follow the same basic pattern, with variations to meet individual requirements as to operating speed, torque capacity and size of work to be handled. Basic operating components are a rotary fixture drive and a pressure cylinder arrangement by which the work is bent to the shape of the fixture as the fixture revolves. As operating specifications most subject to changing requirements are torque and speed, the fixture drive is composed of a motorized self-contained standard speed reducer.

It is reported that torque requirements for a power bender of this type are quite high to meet these requirements and still have a reserve capacity. To keep the machine design compact, the company is using Cone-Drive geared reducers. The larger number of teeth in continuous contact in the reducer provides smoothness of fixture drive, a desirable feature in this type of work. Minor variations in speed between the various ratios of standard Cone-Drive reducers are obtained by selection of the pulley drive between motor and reducer input shaft.

In operation, which is automatic, either forward or reverse, the operator clamps one end of a piece of rolled stock or tubing in the fixture and presses the start button. As the fixture revolves, a shoe is forced against the stock by an air cylinder, forming the strip to the external contour of the fixture. The machine stops automatically and the operator unclamps and removes the finished part.

INSTALLATION COST REDUCED: Using a light weight automatic stud welding gun, roofing contractors reportedly are able to cut corrugated metal roofing installation costs by $5 or 37 per cent a square. A four-man crew, using the fastening method developed by Nelson Stud Welding Division, Morton Gregory Corp., Lorain, O., is able to install an average of about 20 squares per day, compared with an average of 16 for a five-man crew using the conventional installation method. Operator is shown riveting studs along the purlins with the aid of a simple template

Produces Aggregate

LIGHTWEIGHT aggregate is being produced at the rate of 800 cu yd per day by Lone Star Steel Co., Daingerfield, Tex. Made from expanded slag, a by-product of the company's blast furnace, the material has an average weight of 1300 lb per cu yd. Said to have high insulation and acoustical qualities, it is produced at 3300° and is also inherently fire resistant.

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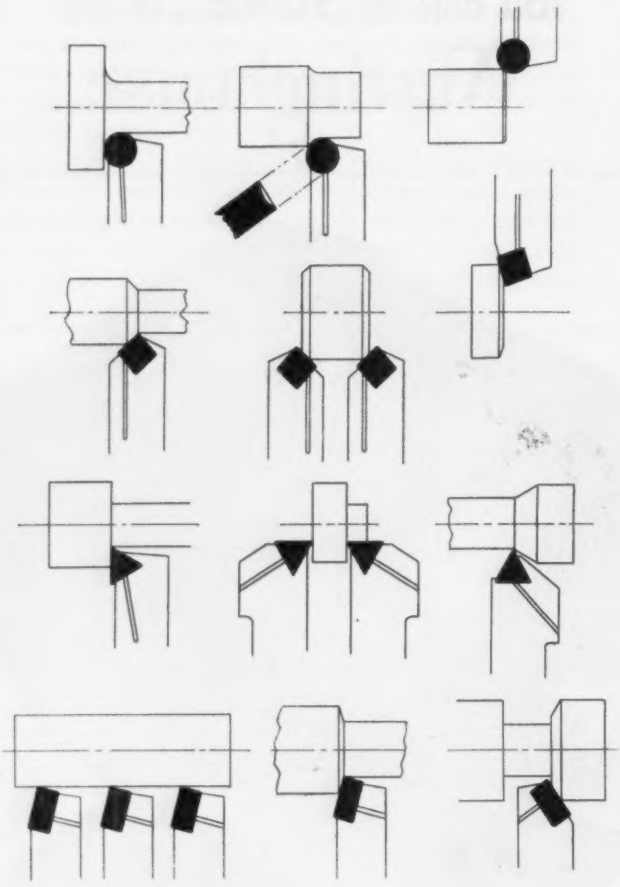

SIX TOOL INSERT HOLDERS

. . . handle bulk of ordinary production work

SOLID carbide insert tools give best results when they are used on applications suited to capabilities of the particular design of holder and bit employed. Choice of correct carbide insert tools, however, is not difficult. Actually, six standard insert holders, such as those shown in the accompanying sketches, will cover a major portion of ordinary production and semiproduction work, Carboloy Co. Inc., Detroit, reports. These, together with information on where and when to use each type simplifies selectivity greatly.

Furthermore, when selecting types, it is useful to remember that each style holder, with its solid carbide insert, has an equivalent standard brazed tool style. Thus, unless there are space limitations which do not allow for the greater bulk of the insert holder, brazed and insert tools may be interchanged without further engineering.

Many regular machining jobs can be performed with these standard holders. Although some highly successful applications also have been made with special holders, in almost all cases standard inserts have been used with these. Usually, special holders are made up to incorporate special angles or receive two inserts rather than one.

Case History Movie

USE of controlled-air-power in effecting cost reductions in various manufacturing processes is depicted in a 16mm black-and-white sound motion picture, titled "Production Miracles Through Controlled-Air-Power," offered by Bellows Co., Akron, Ohio. Actual production scenes show application of the company's devices to standard and custom built machine tools to cut cost, increase production and reduce fatigue in such operations as milling, drilling, tapping and grinding. Film is available from the company in Akron or its regional sales offices.

Shipping Methods Approved

VOLUNTARY simplified practice recommendation on packaging, marking and loading methods for steel products for commercial overseas shipments has been approved for promulation, according to Commodity Standards Division, National Bureau of Standards, Washington. Identified as R237-49, it is divided into five parts: General recommendation, protective coating, packaging materials, definition of terms, packaging detail code, and recommendations for each of 55 different steel products. Copies are available from Superintendent of Documents, Government Printing Office, Washington 25, D.C.

Device Doubles Brush Life

LIFE of brushes and commutators in series-wound, heavy-duty motors reportedly is more than doubled by a new brush stabilizing mechanism which counteracts the wedging effect of the commutators and causes the brush to ride freely in the brush holder. Designed for fractional horsepower motors used in portable electric tools, the device makes it possible to retain overload capacity of series motor parts and at the same time greatly increase brush life through the elimination of reflected vibration to the brush, according to General Electric Co., Schenectady, N. Y.

Mechanisms have been designed to interchange with standard mechanisms as outlined in the NEMA standardization of series-wound motor parts. Change to a brush stabilizing mechanism involves the use of an angular brush top plus the addition of a bracket to seat on the angular brush top. The brush spring pressure is thus partially resolved into a horizontal component which corrects the brush wedging and thus improves commutation and increases brush life. Addition of a roller to the bracket assures close following of the brush on the commutator resulting in improved commutator life, the company asserts. Type BA heavy-duty series motor parts will be available with and without the new mechanism, it is reported.

Developes Measuring System

ALL standard or special 60-degree threads, from 4 to 54-pitch, may be measured using standard micrometers with a new tool being made by W. T. Simmons, Amarillo, Texas. Tool consists of a connected pair of hardened, precision-ground triangular steel bars with points truncated to clear the roots of the thread being measured. The two bars are placed one in each side of a screw thread and a micrometer measurement taken across them.

It is claimed that the new system makes for more accurate measurement, is easier and faster to use and that there is less chance of error because no mathematical formula is needed to work out dimensions for either standard or nonstandard threads.

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Production of PIG IRON

Today the center of iron production is still influenced by fuel availability and remains in western Pennsylvania and the Great Lakes region where low ore freight offsets higher fuel freight

By B. M. STUBBLEFIELD
Manager, Chicago District
Youngstown Sheet and Tube Co.
East Chicago, Ind.

PART II

ALTHOUGH actual combustion material in every fuel used in any blast furnace has been solid carbon, during the history of the process there has been a total of five fuels, one of which, bituminous coal, was of minor importance. First and only important fuel till less than 100 years ago was charcoal. From the use of charcoal, there has been a gradual evolution in this country to the almost exclusive use of by-product coke. The approximate period of dominance of each of these fuels in the United States is as follows: Charcoal until 1855, anthracite 1855 to 1875, beehive coke 1875 to 1919, by-product coke from 1919 to date.

Use of the various fuels naturally overlap the above periods. Raw bituminous coal was popular from 1860 to 1890 around the same period as anthracite. At present no blast furnace in this country is operated on raw coal except in a few rare instances where raw coal may be mixed with coke. Use of charcoal has also dwindled until it now accounts for much less than 1 per cent of the iron production.

Fig. 6—Coke oven battery showing pusher machine in background. High quality metallurgical coke is necessary in the production of pig iron

Beehive coke is generally only used today when the supply of by-product coke is insufficient during periods of extremely high production. Consequently, by-product coke accounts for practically 100 per cent of iron production.

Even though availability of iron ore is the first essential for construction and operation of a blast furnace, the most important factor in controlling their smelting and location has been, and still is, the accessibility of a plentiful supply of satisfactory fuel. This regional influence of a particular fuel has been effective during its period of dominance. During the charcoal era, furnaces were generally built along the frontier in heavily wooded areas. As anthracite replaced charcoal, the center of iron production localized in eastern Pennsylvania. With the introduction of beehive coke, the center of iron production moved west to the Pittsburgh area where the famous Connellsville field of coking coals is located. Even today with the pre-eminence of by-product coke and the saving of formerly wasted by-products which assists in paying coal freights, the center of iron production is still influenced by fuel availability and remains in western Pennsylvania and the Great Lakes region, where low ore freight offsets higher fuel freight.

Both charcoal and anthracite coal are excellent metallurgical fuels. However, they have certain disadvantages which prevent them from competing on an economical basis with coke in today's fast burning high tonnage furnaces.

The strong porous mass which remains as a residue after the heating of coal to distill it into carbon and volatile matter is known as coke. Although only bituminous coal will coke, the coking properties of various bituminous coals vary to a marked degree. In fact, not all bituminous coal will coke, nor will all coking coals yield a satisfactory metallurgical coke. Some coals which appear to be alike in both composition and physical properties may give a completely different response to coking, and, conversely, coals which appear to be different in composition and physical properties may give a similar response to coking. Among the various factors which seem to

affect coking ability are the coal's geological rank or age, the nature, amount and distribution of the mineral content, as well as the amount and distribution of the fusion which is the dull friable coal resembling charcoal. Physical properties and chemical composition of coke depend not only upon the coal used but also upon various details of the coking process, such as coking temperature, rate of heating, time, quench, degree of coal pulverization and sizing and handling of the coke.

A by-product oven consists of three chambers, coking, heating and regenerative, and are usually built in batteries with the heating and coking chambers alternating. Regenerative chambers are normally directly underneath the heating chambers. In modern ovens, the coking chamber is a long rectangular compartment of about 40 feet long, 13 feet high and 18 inches wide. Prepared coal is charged in the top, and coke is pushed out the end. The heat is usually supplied by burning coke oven or blast furnace gas. Since heat is supplied on both sides of the coking chamber, the coal cokes from the sides to the center. The best temperature range for good metallurgical coke is from 1750 to 2000°F and in that range the yield of usable metallurgical coke is around 70 per cent out of a total yield of 73 to 77 per cent.

In order to produce satisfactory coke, a mixture of various coals is generally used and, because of better preparation for by-product ovens, many coals unsuitable for production of beehive coke can be successfully coked in the by-product ovens. Since some coals expand upon coking, care must be exercised in mixing to produce a charge which will contract to avoid damage to oven brickwork.

Big advantage of the by-product process is the saving of valuable volatile substances and coke oven gases which is especially important economically. Under normal business conditions, blast furnaces are seldom profitable unless operated in conjunction with a by-product coke plant. The wasting of valuable by-products, as was done in the beehive process, could readily mean the difference between profit and loss.

Although there is some slight difference in desired coke properties between different blast furnace operators, it is generally conceded that a good coke should be strong, porous, fast burning, free of breeze (refers to the fines ¾-inch and under), and not friable. Physical properties of coke have a direct bearing upon gas distribution in the blast furnace. One of the most important factors governing the coke's physical structure and properties is the rate of coal heating over which close control can be exercised in the by-product process.

With respect to chemical composition a good metallurgical coke should run as follows: Fixed carbon—85 to 90 per cent, volatile—less than 2 per cent, ash—less than 10 per cent, phosphorus—less than 0.050 per cent, sulfur—low as possible, and moisture—around 3 per cent.

Both sulphur and ash have very detrimental effects on furnace operation and economy. About 60 per cent of the sulphur in coal enters the coke which normally is the predominate source of sulphur in iron. Any increase in coke sulphur has a direct effect upon the flux requirement. Amount of ash has a direct bearing on heat requirements for melting the resultant slag.

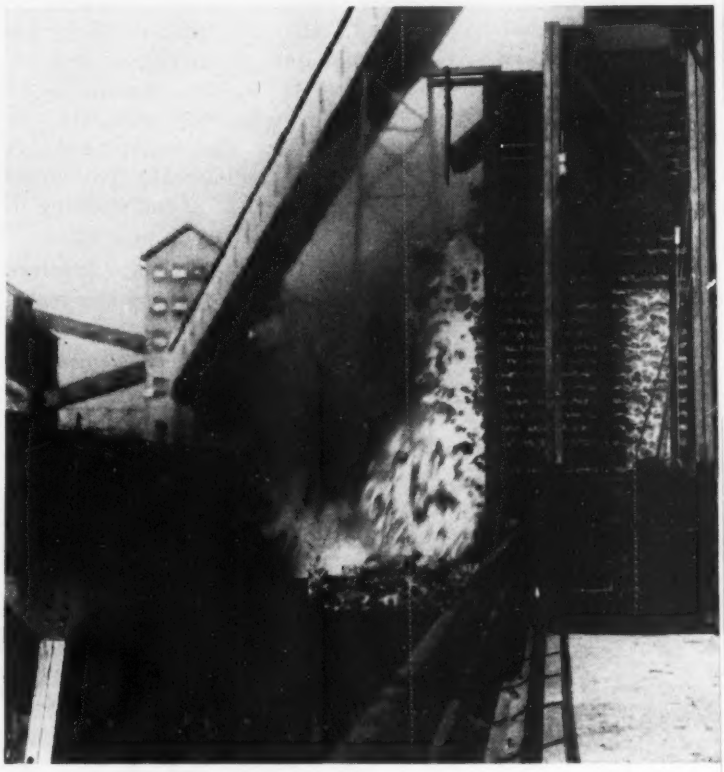
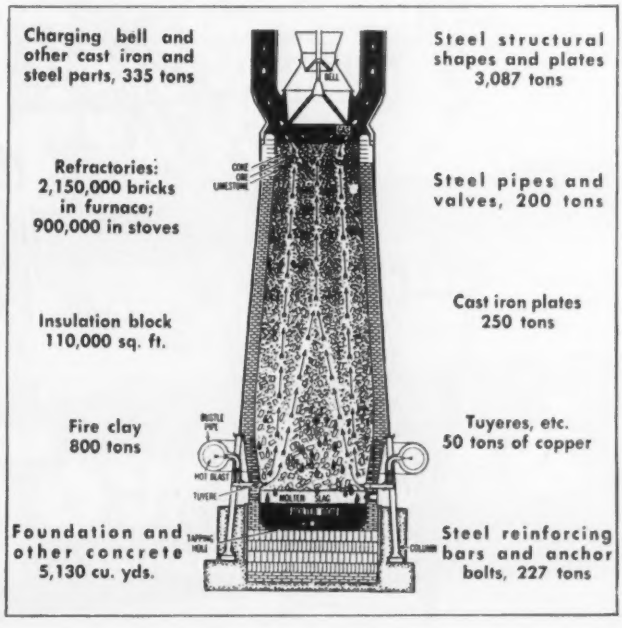


Fig. 7—Red-hot coke is seen being pushed into quencher car

Practically all coke is screened and sized. Sizes from ¾-inch to 4 inches are satisfactory. Normally, the small sizes from ¾-inch to 2 inches are charged separately for better efficiency. Various daily tests on coke are run in practically all plants. In most cases, these tests are to check such properties as

Fig. 8—Principal materials used in construction of blast furnace and its three stoves


Charging bell and other cast iron and steel parts, 335 tons
Refractories: 2,150,000 bricks in furnace; 900,000 in stoves
Insulation block 110,000 sq. ft.
Fire clay 800 tons
Foundation and other concrete 5,130 cu. yds.
Steel structural shapes and plates 3,087 tons
Steel pipes and valves, 200 tons
Cast iron plates 250 tons
Tuyeres, etc. 50 tons of copper
Steel reinforcing bars and anchor bolts, 227 tons

porosity, shatter, size, and resistance to abrasion.

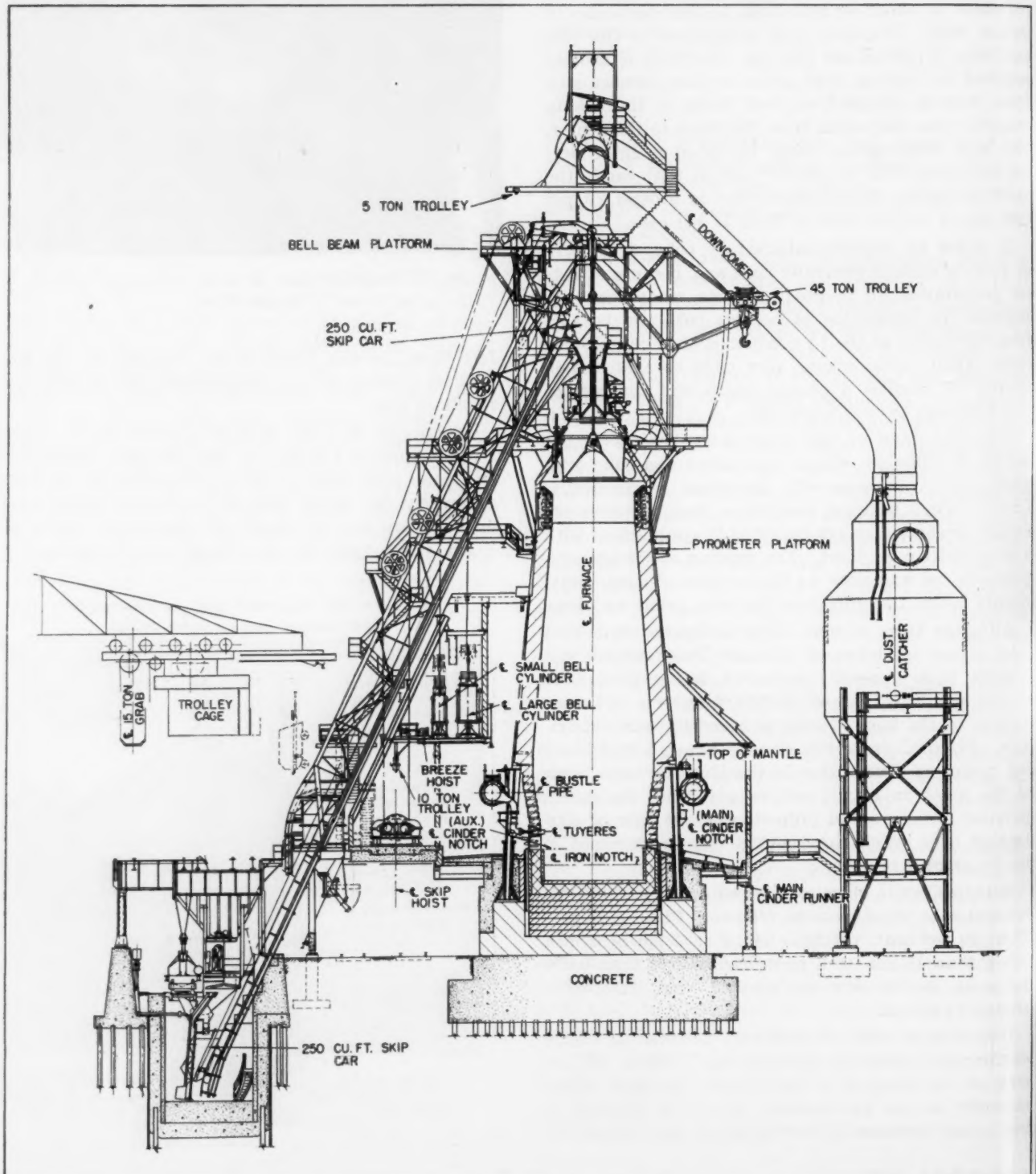
All coal contains both ash and sulphur. Both are highly undesirable in coke and, in the coking process, all of the ash and most of the sulphur remain in the coke. Consequently, these undesirable elements can only be removed before coking. Exact method which may be employed depends upon the coal. This processing may vary from simple crushing and washing to an extensive grinding and concentration process.

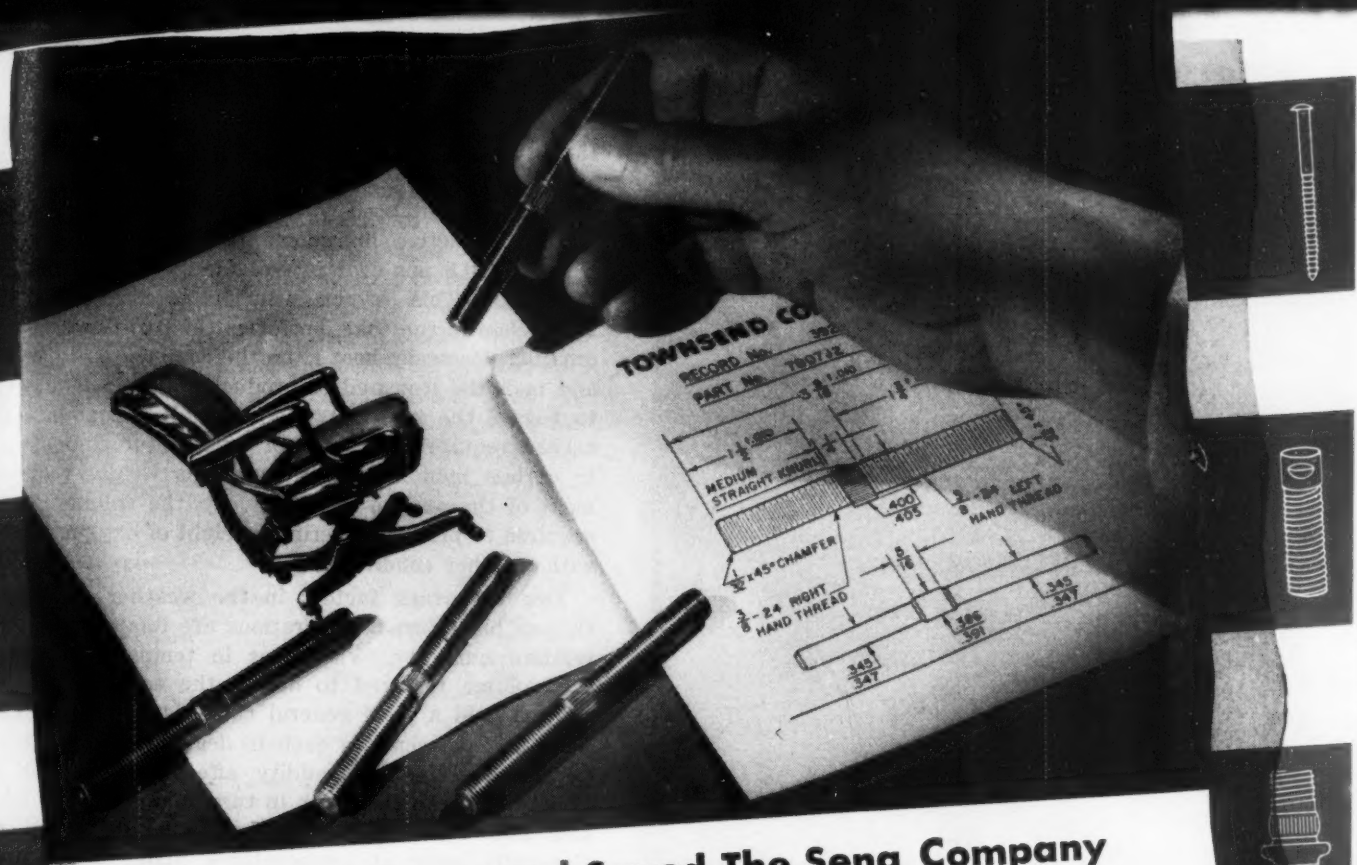
The smelting process in the blast furnace involves the two distinct functions of reduction of the metal and of separation of the metal from the gangue. Gangue is generally of a refractory nature which, if not fused and carried off in a slag, would interfere with smelting and tend to choke up the furnace. Consequently, a flux performs the two following functions: To make the impurities in the ore and coke fusible, and to provide a substance for the impurities to combine with in preference to the iron.

Since gangue present in iron ore is of an acid nature, a basic flux is required to form a slag with the proper characteristics with respect to fusibility. Presence of calcium is generally considered essential for formation of calcium sulfide for removal of sulphur from the iron.

Two common basic fluxes used in this country are

Fig. 9—Sectional view of blast furnace, showing top construction, furnace skip and means for operating both bells and skip





Here's How Townsend Saved The Seng Company $27.63 Per Thousand On One Cold Headed Part

This is an example of how a Chicago manufacturer, *who might have been you*, saved a large amount of money through the use of a Townsend cold headed part and thereby produced a better product for less money. The threaded adjusting screw (illustrated above) for the tilt back of the Seng action control for executive chairs is now being produced at Townsend by cold heading, knurling and roll threading for only $16.87 per thousand. The lowest price quoted for screw machine production was $44.50. This clear saving of $27.63 per thousand is important because Seng chair action control production is extremely high. Not only that, the Townsend part, being cold formed, is stronger than a part machined from bar stock and the roll threads are tougher and more uniform than machined threads. This gives The Seng Company an adjustment screw that works easily and helps produce a better chair at less cost.

This is not an isolated case with Townsend engineered parts and fasteners. It is typical of how Townsend helps save money and time by working closely with manufacturers in designing parts for many applications. Townsend parts and fasteners are cold headed, pointed, machined, drilled, slotted, trimmed, roll threaded, extruded, pierced, knurled, bent or flattened. They are produced in carbon, alloy and stainless steels—in brass, bronze, copper, aluminum—in a variety of platings and finishes.

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New Brighton, Pa.

Chicago 38, Ill.

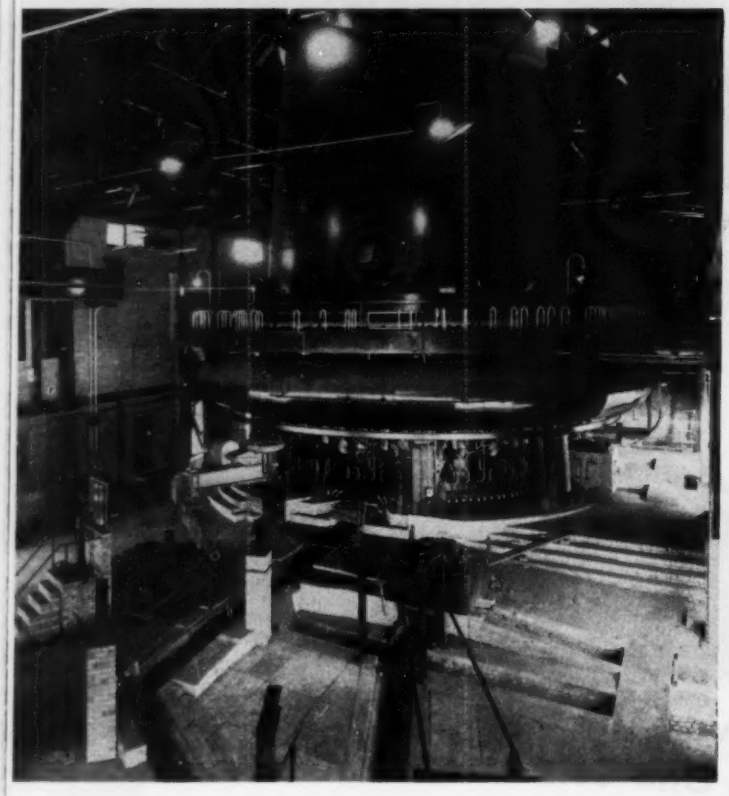


Fig. 10—View of cast house, showing hearth, bosh and part of the furnace stack

limestone (calcium carbonate) and dolomite (calcium and magnesium carbonates). Both dolomite and limestone are widely distributed geographically, and are satisfactory for use in the blast furnace. Primary considerations in determining which to use are cost and availability. In general, dolomite is used in the eastern regions of the country, and limestone is used in the other iron producing regions.

The usual impurities in limestone are silica, alumina, sulphur and phosphorus. The silica and alumina, being acid elements, detract from the value of the stone as a basic flux since an equal amount of the base is required to flux one acid content in the stone. In addition, sulphur also requires a certain amount of calcium oxide for fluxing. Thus, fluxing value of a stone depends upon the "available base," which is the total CaO and MgO content less the total of SiO_2 and Al_2O_3 content and of the CaO required for the sulphur.

A normal slag ratio in the blast furnace is about one part base to one part acid. In general, the lower the ratio of base to acid the greater the slag fluidity and the higher the ratio of base to acid, the greater the slag's desulphurizing power. Although sulphur is removed from the iron generally as CaS and not as MgS, high magnesium content, by increasing slag fluidity particularly in high basic slags does assist in desulphurization.

Practically all limestone is crushed, washed to remove clay and sized. Blast furnace sizes range from 1½ to 6 inches. Fines may be added to sinter, if desired.

The blast, which is furnished at a gage pressure of 15 to 30 pounds and at a temperature of 1000 to 1500° F, is the raw material which is used in the greatest amount both with respect to mass and volume. The active ingredient in the air is oxygen which is 20.8 per cent by volume and 23.2 per cent by weight. This oxygen, which is necessary to burn the carbon in the coke, performs the two functions of creating necessary heat from the combustion to smelt and melt the iron and of producing carbon monoxide to reduce the iron ore. Theoretically, 12 pounds of carbon require 16 pounds of oxygen for combustion to carbon monoxide. Although this weight requirement of the oxygen does not vary, the volume of air required to produce a definite weight of oxygen varies with weather conditions.

Two important factors in the weather which influence blast furnace operations are temperature and relative humidity. Variations in temperature affect the volume required to obtain the same weight of oxygen, and a good general rule is to alter the volume by 2 per cent for each 10 degree change in temperature. Relative humidity affects the weight of moisture in the air which in turn is a source of heat loss and coke consumption at extreme conditions. Generally, only at temperatures above 40° F does the amount of air moisture increase appreciably.

Nitrogen and other inert gases in the air comprise about 80 per cent of the air by volume of which nitrogen is, by far, the principal constituent. These inert gases are actually about one-third of the total charge by weight. This inert gas plays an important role in heat conduction and is the cause of an unavoidable waste of heat.

Central feature of a blast furnace plant is the actual furnace structure. Secondary to the towering furnace but necessary for its operation are the various auxiliaries such as equipment to handle solid products, both slag and iron, to produce the blast, which includes both blowing engines and stoves, to facilitate water cooling of the furnace, to clean furnace gas and to charge solid materials. Depending upon various factors and conditions, such as availability and preparation of raw materials and availability of power, secondary accessory equipment, such as storage bins, handling equipment for unloading and storing of large amounts of solid raw materials, boiler house, power generating plants, extensive coke plants, sintering plants and thickeners for recovery of flue dust may be required.

For construction of a blast furnace of 1200 tons daily capacity and the required stoves, cast and hoist houses, gas cleaning equipment and slag pit, considerable quantities of various materials, as shown in Fig. 8, are required. These figures do not include any steel, refractories, or other material necessary for other probable accessories such as, ore storage yard with docks and cranes, coke plant, power house, or railroad tracks and rolling stock.

An iron blast furnace is a tall cylindrical structure which consists of five main subdivisions which are called the bottom, the hearth, the bosh, the stack and the top. Present furnace lines have been developed mainly by the trial and error method and, for

good efficient production, various furnace parts bear a definite relationship to each other with respect to their physical portions. These relationships constantly changed during the history of blast furnace development. During the modern period of the past 20 years, emphasis was placed on increased hearth area and stack volume as a means of increasing furnace production. Many factors apparently influence the delicate balance of these dimensional proportions. Consequently, changes in present furnace lines are to be expected, particularly with any changes in the required solid raw materials such as ore and fuel.

The approximate dimensions of a modern furnace are as follows:

Vertical Dimensions:	
Height of hearth	10 to 12 feet
Furnace bottom to iron notch	2 feet
Iron notch to cinder notch	4½ feet
Cinder notch to tuyeres	7½ to 8 feet
Height of Bosh	10 to 12 feet
Height of Stack	70 feet
Cylindrical section	8 to 12 feet
Inwall section	55 feet
Stockline section	6 to 8 feet
Horizontal Dimensions:	
Hearth diameter	25 to 28½ feet
Ratio of Bosh to hearth	1.12
Ratio to stockline to hearth	0.75
Slopes:	
Bosh angle	80°
Inwall slope	1 in/ft

Effective furnace volume is the real working volume and a measure of furnace capacity. This volume is measured between a plane at the level of the tuyeres and a plane three feet below the closed bottom bell. In a modern 28½ foot hearth furnace, this volume is around 45,000 cubic feet.

In view of the heavy loading concentrated at the furnace bottom, it is most important that the foundation be strong in order to avoid any large amount of settling which would cause serious trouble and put the furnace out of operating condition. If bed rock is not available, concrete piling must be sunk deep enough to provide a steady platform. For the base, a thick concrete slab of about 50 feet in diameter and 15 feet in thickness is laid. The refractory furnace bottom is placed directly on this concrete pad and consists of about 15 feet of fire brick.

The hearth is the chamber for accumulation of the liquid iron and slag. Size of the hearth naturally varies with the furnace size. Because of the pressure and weight of the burden, it is necessary that the hearth be of heavy strong construction to prevent a possible break-out. Water cooled cast iron or steel plates form the outer jacket, which is usually reinforced by a series of steel bands and wedges. The hearth refractory lining generally varies in thickness from bottom to top and is quite frequently stepped in at the bottom to form a dish-like shape which decreases the danger of bottom bricks floating out. Since hearth temperature is high, some water cooling facilities are provided.

The tapping hole or iron notch is a hole through which molten iron is drawn periodically and is usually located just above the stepped-in bottom bricks. Special brick shapes are used to form this tapping hole. Although the actual opening in the brickwork is square or rectangular in shape, it is plugged with

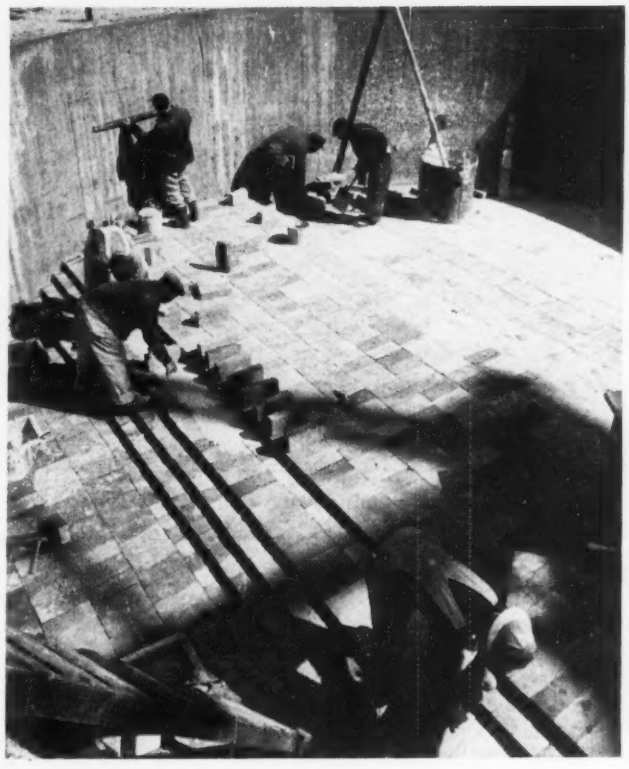


Fig. 11—Layer after layer of heat resisting refractory brick is being laid into this circular concrete base for a modern blast furnace hearth

refractory material, and a circular opening of about 5 inches in diameter is made in the refractory for tapping purposes. After casting, the iron notch is closed with refractory material applied by a mud gun which forces balls of clay at high pressure into the opening. The iron notch is normally opened by means of a rotory drill and an oxygen lance to burn through the inner skull.

The cinder notch is located at a higher elevation than the iron notch and at an angle of 45 or 90 degrees around the hearth circumference from the iron notch. In most large modern furnaces, two cinder notches are provided. The cinder notch is larger than the iron notch and is a round tapering hole in the brickwork. Into this opening, there are inserted a cast iron cooled fitting, a bronze water cooled fitting, a second bronze water cooled fitting, called the monkey, and a cast iron plug. The cinder notch is opened and closed with the cast iron plug.

Tuyeres, which are water cooled copper castings designed to deliver and distribute the hot blast, are located below the bosh. Number of tuyeres varies from 8 to 20 depending upon furnace size. Many operators believe that the number of tuyeres used should be sufficient to make the combustion areas in front of the tuyeres contiguous. In any case, tuyeres must be arranged symetrically around the furnace. Distance between tuyeres is normally 4 to 6 feet on the circumference, and the tuyere area bears a definite relationship to the volume of blast per period of time. Height of the tuyeres determines the maximum permissible height of slag in the furnace, and serious furnace slips or reduced blast pressure can

force slag to back up into the bustle pipe. A hot blast main delivers the blast from the stoves to the bustle pipe which encircles the furnace which in turn delivers the blast to the tuyeres. Both the hot blast main and the bustle pipe are refractory lined steel pipes of 4 to 6 feet in diameter provided with man holes for cleaning. To prevent uneven gas distribution, this entire blast system must be designed and constructed so that the blast is evenly distributed to all tuyeres.

The bosh is the area of greatest diameter and also of highest temperature. This section of the furnace is not enclosed in a steel jacket. Instead the brickworks are held together and stepped out over supporting steel bands called bosh bands. This section does not support the stack weight. As a general rule, the bosh brickwork is supported by the hearth, and the steel bands are suspended from the mantle. The bosh extends from the tuyeres to the mantle and is inclined outward at an angle of approximately 10 degrees from the perpendicular. Bronze water cooled plates are always inserted at staggered intervals in the lining.

The mantle which is located at the top of the bosh is supported by 8 to 12 columns of cast iron or heavy structural steel from the foundation and is composed of heavy steel plates and structural steel shapes. Purpose of the mantle is to support the furnace stack and top structure. Both these supporting columns and tuyeres must be spaced evenly around the furnace. In addition, the columns and tuyeres must be spaced symetrically with reference to each other and in such a fashion that they do not coincide.

(To be continued)

Powder Cutting Solves Problems

UPON construction of a five-story high catalyst tower at a mid-west refinery, it was found that the inner chamber was 3½ feet too long. As well as shortening the column, which was made of 12 per cent chrome steel 1 inch thick, it was also necessary to cut eight holes in the inner chamber to allow heat to pass into the outer chamber while the entire tower was stress relieved in position. The holes were welded back after treatment.

Using the powder-cutting process developed by Linde Air Products Co., New York, some 70 feet of chrome steel was cut, the entire job taking 2 days. The process provides an easy method to cut material such as stainless or high-alloy steels, oxidation-resistant to the normal oxyacetylene flame. An iron-rich powder, blown into the oxygen stream from outside the preheat flame, is heated to ignition temperature by the oxyacetylene preheat flame. Ignition of the powder creates a high-temperature reaction and, as the cutting proceeds, a combined melting and fluxing action continuously removes any refractory oxides formed.

Shot Has Extended Life

MADE of steel that has received a full heat treatment and which has a combination of hardness and toughness is Tru-Steel shot, for use in all types of blast cleaning equipment. Available from American Wheelabrator & Equipment Corp., Mishawaka, Ind., the shot has been undergoing controlled tests in metal working plants throughout the country for several months.

Results of these tests have shown that the useful life of the shot is much longer and that it wears down and does not break down. It is said that there is no possibility of fragments imbedding in soft work. Other advantages are greatly reduced wear on blast cleaning equipment, cleaning as fast as other types of shot and lower cost per ton. It is reported that on one heat treat descaling job only 2.73 pounds of shot per wheel hour were used in 476 wheel hours.

Color System Developed

SELECTION of the proper diamond abrasive grade is simplified and the possibility of human error or waste in diamond abrasive application is minimized with the new color identification system of Industrial Products Division, of Elgin National Watch Co., Aurora, Ill., for its Dymo diamond compound. Used for precision finishing, carbide lapping, mold polishing, etc., the compound features precise, abrasive particles size grading and a new synthetic vehicle with a high degree of chemical and physical stability over a wide range of temperature variation.

In the new color identification system, the various grades of diamond abrasive particles are arranged in a definite color sequence in accordance with an easily remembered system—"the lighter the shade, the finer the grade." The finest metallographic polishing grade is white, while the coarsest grade, 100 mesh, is black.

Hardening 800 Pieces Hourly

HARDENING and quenching operations are performed on automotive plates at the rate of 800 per hour on a newly designed radiant gas machine, a product of Selas Corp. of America, Philadelphia. Pieces are placed on the rotary refractory hearth by a loading arm. The hearth moves past a series of 24 radiant ceramic gas burners, advancing the pieces at the required temperature-time. At the end of the cycle, the nickel-chrome alloy ejector arm tumbles the pieces into the quench chute, which is baffled to alternate the delivery of heated pieces to two quenching chambers.

Two quenching chambers are required to obtain the proper quenching time because of the high delivery rate of the heated pieces. Limit switches control the operation of the unloading arm, quench chute baffle, opening and closing of the quench dies and water injection. A combustion controller supplies premixed-gas and air in complete combustion proportions.

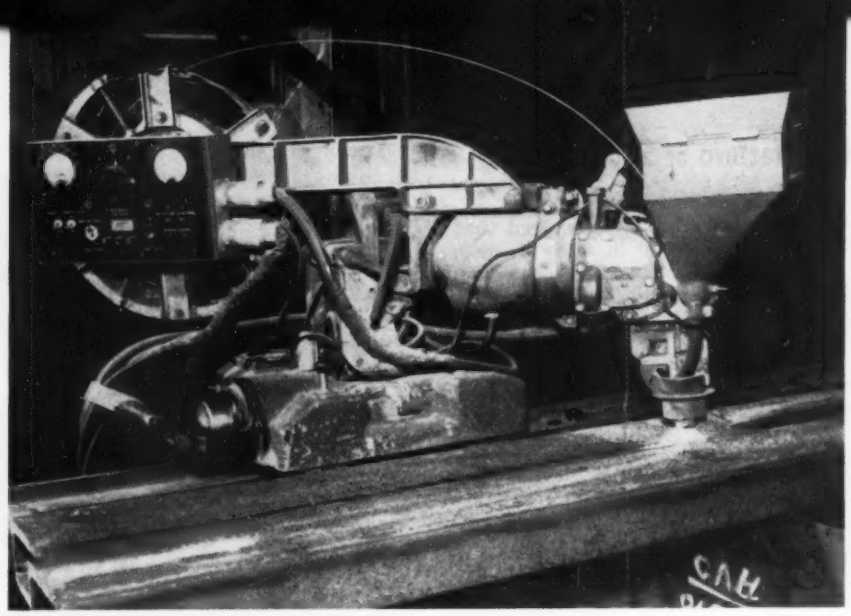
Zipper Conveyor Offered

BREAKABLE materials may be handled gently and without contamination by zipper belts in a conveyor-elevator system. As made by B. F. Goodrich Co., Akron, O., rubber teeth on the belt can be locked or unlocked at any point by the use of rollers which operate on the same principle as the tab on a conventional slide fastener. The noiseless belt can travel horizontally, vertically, on a slope and around curves.

Discusses Fly Ash Problems

BASED upon research sponsored by the Bituminous Coal Research Inc., Pittsburgh, is a reprint of a paper by Carl E. Miller on "What Can The Small Plant Do About Fly Ash". It deals primarily with the dust in stack gases from the small hand-fired or stoker-fired commercial and industrial boiler plant.

Data on dust loadings and size consists as influenced by type of firing equipment and burning rate are discussed.



Box beam type of dipper sticks being welded at rate of 12 inches per minute

BOX BEAMS

. . . Produced Economically by Welding

STRENGTH and lightness, the advantages inherent in the box beam type of construction, frequently cannot be advantageously used because of the comparatively high cost of producing this type of beam. However, by welding, the Dominion Bridge Co., Montreal, Que., has found it quickly and economically possible to produce these sections with a low cost per foot of weld.

The beams, as made by the company, are 16 ft long. Used as dipper sticks, they are made from 6 x 12-inch angles which are ⅝-inch thick. The long leg of each angle is beveled 30 degrees to produce a welding vee for the butt-corner type of joint which is backed by a ½-inch diameter rod. After the parts are tacked by manual-arc welding, three weld passes are applied by a Unionmelt machine, made by Linde Air Products Co., New York.

Axles for the company's power shovels require another form of box section made by the company. Two channel sections are rolled from 1 inch plate and are welded face to face. The edges are beveled to provide a 22-degree vee and a strip ⅜-inch thick and 1½ inch wide which backs the joint. Five passes with the machine fill up the seams and give a slight reinforcement. Use of the welding process is said to eliminate the need for chipping of the seams between passes. The fused composition strips off by itself and leaves the weld metal smooth and clean, ready for the next pass of the machine.

Report Evaluates Alloy

A SURVEY of the mechanical properties of some 200 alloys in 40 magnesium alloy systems reveals that, of those systems studied, magnesium-zinc-silver-manganese-calcium is the most promising combination for further study and development. This fact is brought out in a 243-page report, PB 97657, new magnesium alloys, available from Office of Technical Services, Department of Commerce, Washington. Undertaken by Rensselaer Polytechnic Institute for the Air Force, the study disproves certain favorable assumptions made regarding the high mechanical strength and good workability of the German Giesche alloy.

It is also reported that the addition of 5 per cent each of the intermetallic compounds $Cd_{21}Ni_5$, Cd_3Cu, and Cd_3Sb_2 failed to improve the mechanical properties of magnesium and magnesium-zinc base compositions. Although too limited to draw specific conclusion, preliminary investigation of warm rolling procedures for dilute magnesium-base alloys indicated the possibility of increased ductility and toughness with moderate strength properties through these methods.

Study of the magnesium-zinc-aluminum-tin system agrees with earlier results indicating that magnesium-5 zinc-3 aluminum-3 tin was the best combination of this system. Magnesium-5 zinc-1 silver-1.5 manganese-0.3 calcium alloy still has the drawbacks of hot-shortness and extreme sensitivity of mechanical properties to small variations in composition and handling procedures.

Welder and Compressor in Truck

EQUIPMENT necessary for the field servicing of military, mining, construction, oil field, agricultural or other machinery operating at distances from service centers is incorporated in the truck mounted mobile field service unit, type PW-308, designed by Davey Compressor Co., Kent, O. Main equipment items include a 300 amp welder and an 8 kw alternating current generator, driven direct from the truck engine through a heavy-duty power take-off. Power for the operation of the unit's high pressure lubrication equipment is provided by a Little Workhorse compressor operating at 150 pounds pressure.

Also included in the unit assembly are the following pieces of equipment: Oxyacetylene cutting and brazing outfit; an 8-inch electric motor-operated bench grinder; portable arbor press; floodlights; 7500 pound winch; and complete complement of service tools, electric drills, etc. The all-steel utility and service body provides space for the transportation of driver and six passengers. Body has built-in tool boxes and storage bins, is waterproof and can be locked.

Screw Grab Handles Pulp

OPERATING as part of an overhead crane of carrier made by Cleveland Tramrail Division, Cleveland Crane & Engineering Co., Wickliffe, O., is a new type screw grab for handling pulp or similar materials. Grab has three floating heads, each with three motor-driven screws or augers that screw into the pulp and hold it secure while in transit. A light on each head, visible to the crane operator, indicates when the bales are firmly in position. Three bales may be handled at one time.

Manufacture of Sponge Iron

(*Continued from Page 75*)

5. Of lump ores it is required that sulphur shall occur in such a state that it can be removed effectively in the preheating zone. This is the case with most lump ores, which can be exemplified by the following:

Grade ore	% S in lump ore	% S in sponge iron
Kiruna A	0.040	0.008
Steep Rock	0.043	0.008

Normally sinter feed has been used in the Soderfors plant. Porous light-burned sinter, which does not disintegrate in the shaft, is considered ideal. With certain kinds of concentrates it is necessary to burn the sinter somewhat harder to avoid disintegration. This is the case with highly concentrated ores and limy concentrates.

Trial runs show that pelletizing would give a suitable charge for the Wiberg-Soderfors method.

A large number of Swedish and several foreign ores have been tested. Most rich lump ores can be used successfully. Among hematite ores the Canadian Steep Rock has been found ideal. Sponge iron of the following analysis has been obtained from it.

	Per cent
Iron, total	90.7
Iron, metallic	86.1
Reduction	94.9
Carbon	0.75
Suphur	0.008
Phosphorus	0.027

The production rate was 27.5 tons in 24 hours with Steep Rock lump ore and could probably have been increased considerably.

It is also known that Spanish hematite ores are excellent for this process.

Kiruna A lump ore has been reduced with good results, although the production has been somewhat lower on account of the compact form of the ore, as shown by the following results:

Sponge iron output per day, tons	22
Total iron, %	92.6
Metallic iron, %	83.6
Reduction, %	90.3
Carbon, %	1.22
Sulphur, %	0.008
Phosphorus, %	0.018
Power consumption, kwh/ton	840
Charcoal consumption, lb/ton	480

This sponge iron process makes it possible to obtain a rich sponge iron from certain poor ores, which otherwise are difficult to concentrate. This is the case if the gangue occurs in such a form that the finished sponge iron is separated easily from the gangue by crushing. The reduced ore then is concentrated magnetically after crushing. Such trials have been carried out successfully with certain Swedish silica-banded hematites from Striberg running as low as 45 per cent Fe.

Even with rich lump ores magnetic separation of the sponge iron can be profitable, especially if the gangue occurs in large grains.

The Soderfors plant was built to use charcoal, which was previously considered the only possible fuel, partly because of the low-sulphur content.

The construction of a suitable carburetor for charcoal met with great difficulties. A large number of designs have been tried in Soderfors and elsewhere. Generally, they shared the principle that the charcoal bed was heated by an electric current fed in by two or more electrodes, and the gas was carburized by blowing it into the hot zone between the carburetor electrodes.

However, the electric resistance of charcoal, contrary to that of metals, falls with rising temperature. When the injected gas thus cools the hot zone between the electrodes, the current is concentrated to a path where the smallest quantity of gas passes. Hence, the gas is badly carburized, while the heat from the arc can melt the brick work in other parts.

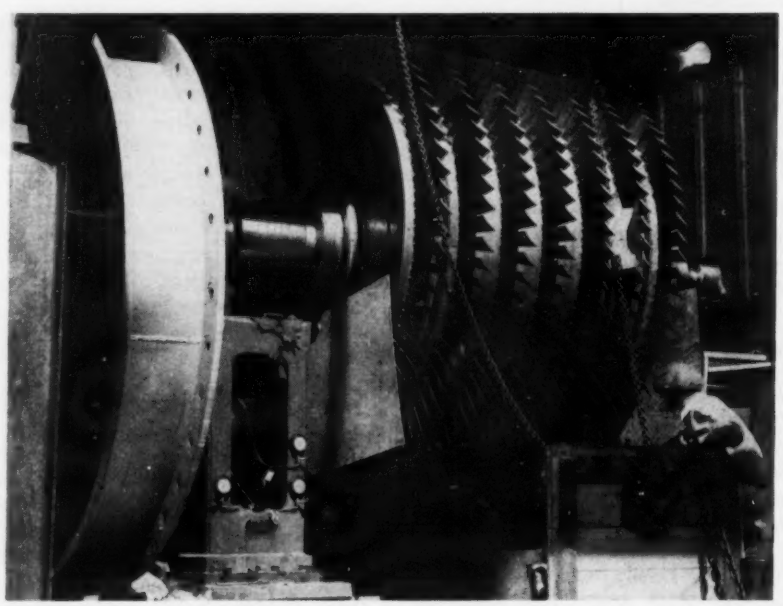
These difficulties have been finally solved by the Soderfors carburetor. This device, shown in Fig. 2, works so that both gas and charcoal pass through the carburetor in the same direction. The charcoal is charged through a central pipe in the roof, while the gas flows trough a concentric opening round the pipe, thus coming into the space between the charcoal and the roof.

In this design, electric power is introduced by six electrodes projecting down through the roof. Because of this construction the central part of the charcoal is heated to a high temperature. The main part of the gas goes down along the walls of the shaft and is heated by conduction and radiation from the center. In the lower, narrower part of the carburetor the gas is forced into the hot charcoal, and there an effective final carburization takes place. The necessary hydrogen is fed in as fluid fuel through a pipe in the upper part of the carburetor.

It is desirable to be able to run the process with mineral fuel. Taking the required hydrogen content of the gas into account the following combinations can be considered.

Fuel	% by weight		
Charcoal	100		
Coke		65	80
Fuel oil		35	
Natural gas			20
	100	100	100

Theoretical consumption per ton of metallic Fe is 340 pounds C and 20 pounds H_2.



SUPER SIZE: Steel impeller blades used on the circumference of this supersonic wind tunnel compressor rotor are among the largest ever forged. Measuring over 18 inches long and 6 inches wide, the blades weighed 45 pounds as forged by Steel Improvement & Forge Co., Cleveland, for the Langley Field tunnel. Compressor rotor was built by Allis-Chalmers Mfg. Co., Milwaukee. NACA Photo

HOW "GRAY PLATE" was eliminated in automatic CHROMIUM PLATING

1.

COSTLY PROBLEM:

Instead of a flawless, sparkling chromium finish, an automatic plating machine was turning out too many pieces of "gray plate" in this plant. These rejects were piling up needless refinishing costs and blocking the way to full productivity. Strangely enough, everything in the plating cycle checked up OK.

2.

BAFFLING CASE. The plant chemist and foreman could find no reason at all for the trouble. Cleaners were perfect. Nothing wrong with the plating baths. The machine was working smoothly.

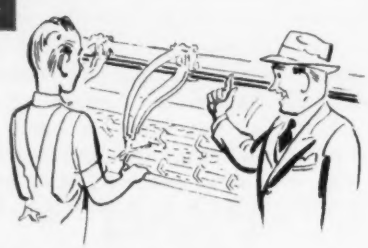
3.

LET'S GET TO THE BOTTOM OF THIS. There *must* be an answer. Let's see what United Chromium has to say. They've got the know-how.

4.

PUTTING THE FINGER ON IT. After testing, the U.C. engineer suspected that chromium was being plated on a *passive*, rather than *active*, nickel undercoat. The two look alike, but one means bright chrome, the other a reject.

5.



X MARKS THE SPOT. Sure enough, there was a 15 second lag between the time work was immersed in the chromium bath and contact made. Even in that short time, the nickel was turning passive.

6.

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FLOATING BEHEMOTH: The 195-foot line type crane boom of this floating crane is shown lifting a 152-ton load at an 80-foot radius. Mounted on a 90 x 300 foot barge, the floating crane, said to be largest of its type constructed for operation in this country, is steam powered by a Scotch marine boiler made in Titusville, Pa., by Titusville Iron Works Division of Struthers Wells Corp. Crane was built by Wiley Mfg. Co., Port Deposit, Md. The oil-fired, all-welded boiler has a design pressure of 150 psi

In practice a consumption of 500 pounds of charcoal per ton of metallic Fe is reasonable for a furnace producing 22,000 tons of sponge iron per year.

Coke has a considerably lower electric resistance than charcoal. The resistance of coke also falls with rising temperature but not as rapidly as that of charcoal. On account of these differences the same construction of the carburetor cannot be used for both kinds of fuel. The lower resistivity coefficient and the higher heat conductivity of coke are of great advantage in constructing a more efficient carburetor, but on the other hand coke has the disadvantage of a relatively high ash content, which makes it necessary to keep the temperature below a certain limit in all parts of the carburetor to prevent sintering.

A special coke carburetor has now been designed at Soderfors. Because of the lower electric resistance, this unit has the form of a relatively high vertical shaft. The coke pillar in this shaft serves as a resistance body for the electric current pilot scale. A carburetor of this design has been operating continuously for a long period and has afforded satisfactory results. A coke carburetor of full size to supply all the necessary gas to the furnace now is under construction.

A common problem for all carbonaceous fuels is the question of sulphur. One can assume that most of the sulphur in the fuel is transferred via gas to the sponge iron, the sponge iron thus gaining about 0.2 per cent S. It is therefore necessary to clean the gas from the sulphur, which can be done by letting the gas pass through a shaft filled with limestone, dolomite, etc., in pieces. Practical tests in Soderfors and elsewhere have shown that sulphur can be removed satisfactorily in this way.

Much heat is necessary in the carburetor to convert the carbon dioxide and water into carbon monoxide and hydrogen. It has been supposed in the foregoing that this heat is produced by electric power. It, however, can be obtained by allowing some of the fuel in the carburetor to be burned with pure oxygen to carbon monoxide. In this way more fuel is consumed, but on the other hand no electric power is used in the carburetor, besides which the construction of the carburetor is simplified and expensive transformers are unnecessary. A schematic diagram of this version of the process is shown in Fig. 6.

As the whole quantity of gas cannot be utilized for reduction and preheating this modified process gives some excess gas which can be drawn off ahead of the carburetor and used for other purposes.

With only carbon as fuel the theoretical consumption using this modified carburetor is 650 pounds C and 570 pounds (6900 cubic feet) O_2 per ton reduced iron. At the same time about 3500 normal cubic feet of gas in excess, containing 70 per cent CO and 30 per cent CO_2 are obtained.

As mentioned, the most suitable reduction gas is not pure CO but for example 70 per cent CO and 30 per cent H_2. The water vapor in the circulating gas can be condensed, by which fuel and oxygen consumption are reduced. The theoretical consumption per ton metallic Fe in this particular case is roughly,

Element	Pounds
Carbon, C	430
Hydrogen, H_2	36
Oxygen, O_2	360

The quantity of excess gas is in this case smaller. Coke, coal, oil, natural gas, or water gas ($CO + H_2$) can be used as fuel in proportions giving the hydrogen content wanted.

Use of Sponge Iron—Sponge iron manufactured at Soderfors is melted in basic electric arc furnaces. Steelmaking at this plant is based entirely upon sponge iron as raw material, the charge generally being made up of 70 per cent sponge iron and 30 per cent home scrap.

Scrap is charged on the bottom of the furnace and sponge iron from containers through a hole in the furnace roof. Because of the low conductivity of the sponge iron, the electrodes are embedded in the sponge iron and arc against the scrap. Consequently, the thermal efficiency is high, and full power can be switched on immediately, without any risk of endangering the roof.

An electric arc furnace is considered suitable for melting sponge iron. The low weight by volume of sponge iron, about 1.5 with 82 per cent Fe,

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*T.M. of Harnischfeger Corporation for electro-magnetic type brake.

EAD CRANES · HOISTS · EXCAVATORS · ARC WELDERS and ELECTRODES · SOIL STABILIZER · CRAWLER and TRUCK CRANES · DIESEL ENGINES · CANE LOADERS · PREASSEMBLED HOMES

is no inconvenience if roof charging is employed.

When used in the open-hearth furnace, sponge iron should have as low a slag content as possible and a high weight by volume.

However, tests in Swedish works have shown that good results can be obtained even with poor sponge iron with 77 per cent Fe, unbriquetted, as an addition to open-hearth charges.

Some iron from rich lump ores has a specific gravity of 4.0 and a weight by volume of about 2.0 or more. Such sponge iron is suitable for open-hearth furnaces, and this should also be true of sponge iron from pellets of rich concentrates.

Another application for this method of reduction is to produce a prereduced charge for electric pig iron furnaces. In this case the electric pig iron furnace gas can be used conveniently as reducing agent in the spong iron plant, insuring a considerable saving in fuel.

Advantages afforded by the Wiberg-Soderfors method, are:

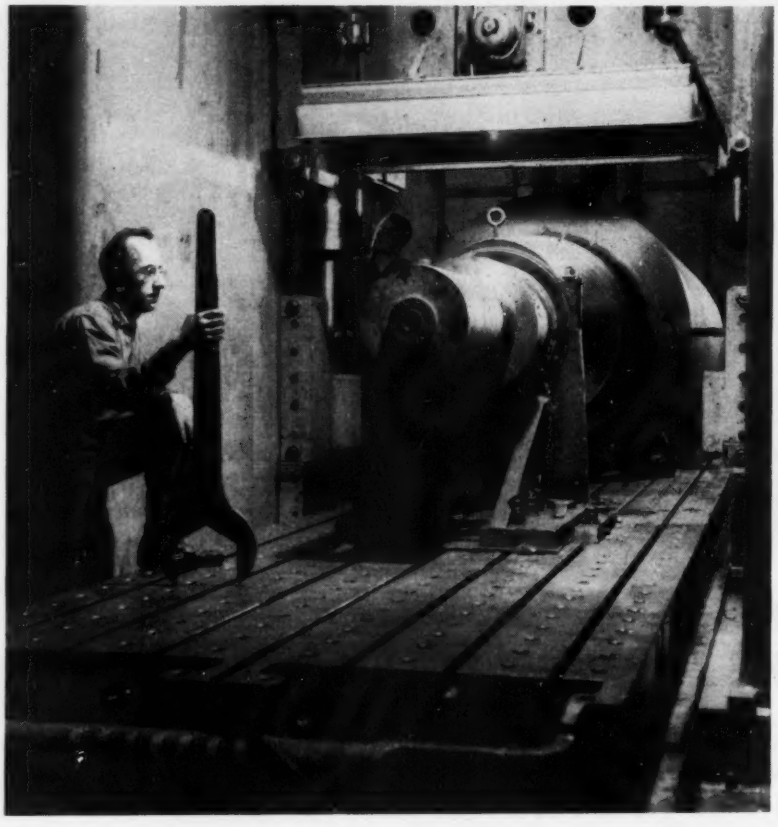
1. Ores of different kinds can be used, lump ores as well as concentrates (after sintering or pelletizing)
2. Sulphur is effectively removed.
3. Sponge iron obtained is suitable for melting in electric arc furnaces.
4. Fuel consumption is low.
5. Fuels of different kinds can be used, according to supply and price.
6. Number of workers necessary is small.
7. Building costs are low, about $520,000 for a plant (in Sweden) producing 22,000 tons of sponge iron per year.

Interest in the sponge iron method at present is great and negotiations are in progress with a view to erecting sponge iron plants both in Sweden and abroad. A plant producing 22,000 tons a year is under erection in Sandviken.

Gas Brazes Propane Cylinders

SEAMS in steel shells for 100-pound propane cylinders are made liquid and gas-tight by copper-brazing with radiant gas burners in automatic machines designed by Selas Corp. of America, Philadelphia. A motor driver carriage moves a 0.110-inch shell, 36 inches long and 12 to 16 inches in diameter and tack-welded to size, into the brazing position within the machine's framework. A pushbutton initiates the brazing operation.

Carriage contacts a limit-switch at the end of its rail, starting a time-relay that instantly brings the idling radiant gas burners, positioned to heat the outside and inside of the seam, to the required temperature for brazing. During the 1.25-minute heating period, an electrolytic copper brazing rod melts and flows uniformly between the fluxed surfaces of the 1-inch lap. At the end of the heating time, the burners return to idling and the reversible motor moves the carriage to the starting position, completing the operation on contact with a second limit-switch in 1 minute and 40 seconds.



POWERFUL PLANER: Two 75 hp vertical spindles and two 60 hp side heads provide the drive for this planer type miller, said to be the most powerful in the country. Installed in the new turbine plant of General Electric Co., Schenectady, N. Y., it is about to perform a slotting operation on a 130,000-pound steel rotor core which is resting on the 40-foot table. Longitudinal cuts will be made along the 14-foot length of the core. Shafts up to 62 inches in diameter may be handled

Exhibits Box Construction

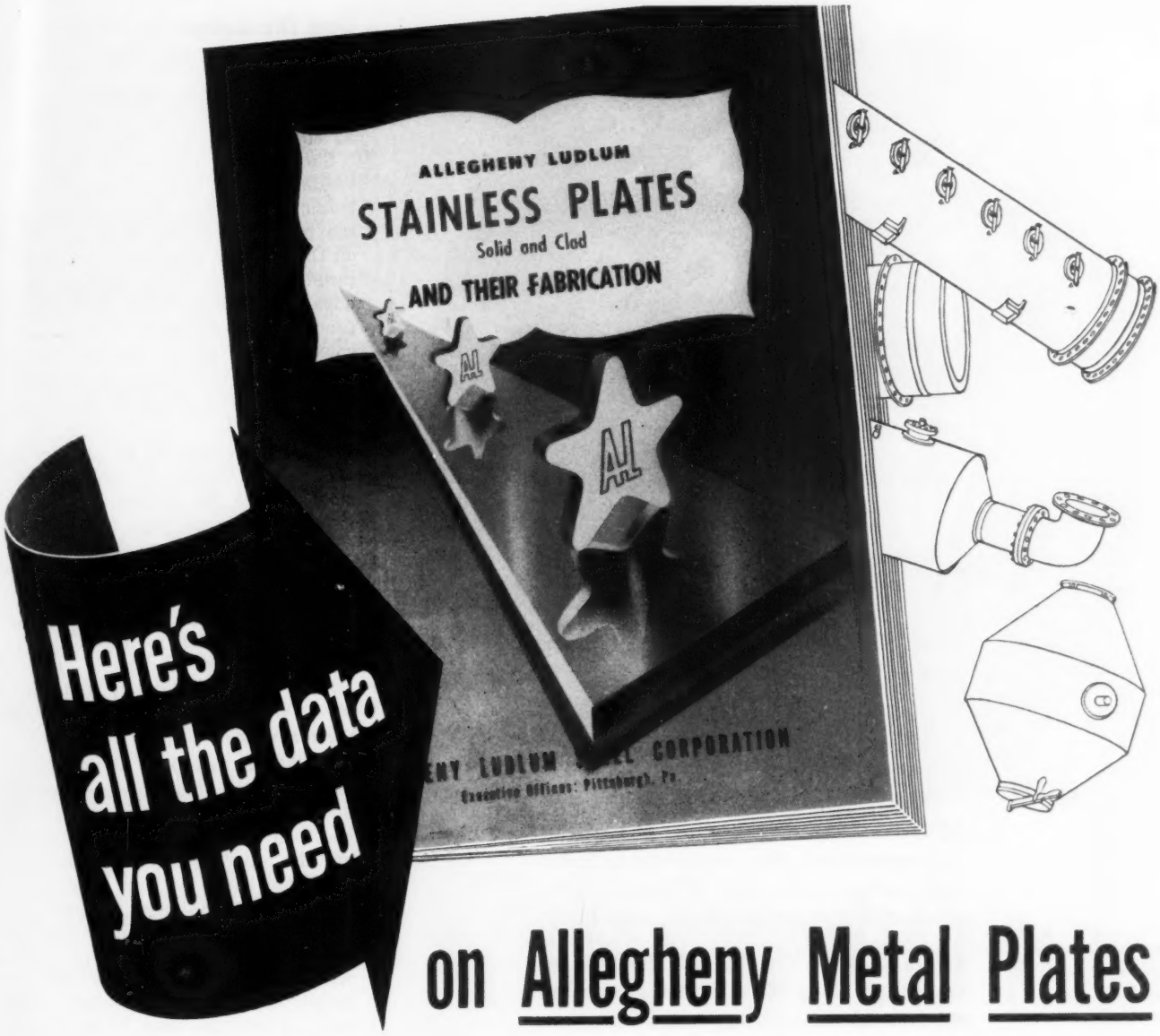
CONSTRUCTION principles for corrugated boxes which make possible heavier loads with protective safety is the feature of the exhibit by Hinde & Dauch Paper Co., Sandusky, O., at the fourth annual Industrial Packaging Materials Exposition, Detroit.

Purpose of the exposition, to be held in Convention Hall, October 4 to 6 and sponsored by the Industrial Packaging Engineers Association of America, is to demonstrate the application of good engineering practices in the industrial packaging and materials handling fields.

Machine Gages and Segregates

ALL CRITICAL dimensions of automotive valve tappets are automotically checked and the parts are properly segregated into acceptable, rejected and salvageable classifications by a machine recently developed by Sheffield Corp., Dayton, O. Designed for a motor car manufacturer, the machine has a cycle capacity of 2000 parts per hour and requires one worker to operate it.

Gaging operations performed include the automatic diameters at each end and taper, the major internal diameter depth of both major and smallest internal diameters; solid end face for squareness with the bore and overall length. There is also a check for concentricity of internal diameter with outside diameter and out-of-round on 50 per cent of the otherwise acceptable parts that go through the gage. Machine consists basically of a loading station, five gaging stations, five segregating stations and two unloading stations.



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1. **SCRAP LOSS—". . . because of high finish requirements, the percentage of scrap was excessive. Use of D. A. Stuart's SOLVOL reduced scrap losses to the minimum."**
2. **TOOL LOSS—"Overall tool life was increased 50% by SOLVOL as compared to the best of other cutting fluids tried."**
3. **TIME LOSS—"Floor-to-floor machining time was decreased 14% after application of SOLVOL."**

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Dual Die Setup

(*Continued from Page 77*)

operate both dies required to produce complete cabinet bodies and to do so in a single working stroke.

Such a setup, it might be supposed, would have an unfavorable effect by loading the ram more heavily on the side having the draw die, than on that for the combination trim and forming of the return flanges. The unbalance is minimized, however, by providing two hydraulic cushions, and constructing the die so that one of the cushions is loaded to compensate for what would otherwise be an unbalanced load.

Thus, while one die is making the draw, the cushion on the opposite side imposes the desired compensating load through pins that project from the cushion up to the die platen. Valves are set so resistance imposed by the cushion is increased after the flash is sheared. This increased cushion resistance is imposed while return flanges are being formed (which requires relatively little pressure) while drawing continues on the other side.

No Metal Fracture—With the hydraulic press, fast traverse occurs until the dies begin to do their work and then is retarded to permit drawing and other operations at the most favorable speed without fracture of the metal. In no case, can the total pressure exceed the maximum set, as the press ram reverses if the resistance to motion exceeds the predetermined pressure setting. This protects the dies even if two blanks happen to be inserted at the same time.

In addition, the hydraulic cushion which controls the pressure ring setting on the draw die can be adjusted instantly to provide precise pressure needed to yield a good draw and to avoid wrinkles on the flange.

Dies employed for this particular operation are set with the draw die at the left (when facing the front of the press), Fig. 1, and the trim-and-form die is at the right. In this case, the punch of the draw die is fixed to the lower platen and the die is on the ram. Thus drawing is done upward. As the draw die is opened, the drawn part is stripped off the punch and the operator inverts the drawn part and passes it into the second die with flange up. He then loads a new blank.

Trimming Position Checked — A second operator located at the back of the press sees that the drawn part is properly located for trimming and, after trimming and forming of the return flanges are done, removes

the finished piece and the flash ring, places them in tote boxes and reloads his die.

In the trim operation, the second die produces a notch at each corner so that, when the return flanges are formed, their edges meet properly. The shear punch does not have a 90-degree shearing edge but is beveled so that, as the punch moves downward after shearing is completed, the flange is formed by the punch as its heel slides over the metal without marking it. Besides making a stiffer cabinet, the return flanges form channels for wiring applied later. See Fig. 3 for design details of trimming and flanging die.

Fig. 4 shows the blank employed for the cabinet, the flanged piece as it appears after drawing and before trimming and two completely formed cabinets as they appear from front and rear after the trim-and-form operation.

Piercing Combined with Forming—In the case of cabinets that are to receive piano hinges, six screw holes are pierced in the flange along one side, as shown in Fig. 1, this being done, of course, in the same die that performs the trim-and-form operation. Supplementary operations are performed later on sides of the drawn cabinet to slit and form ears inwardly, Fig. 1, to receive the adjustable shelf supports, these being small separate stampings of stainless steel.

Although the production rate is the same on the hydraulic press as for the two older type replaced presses, and the labor charges are about the same, as two pressmen are required in both cases, there is a substantial reduction in scrap and improvement in average quality of the cabinets. Besides this, the smaller space needed for the single hydraulic unit has released additional plant space for other operations.

Booklet Describes Films

Sound motion pictures and slide films for education and entertainment programs, available from Westinghouse Electric Corp., Pittsburgh, are described in a 46-page booklet available from the company. Discussed is the non-charge basis on which the films can be borrowed and information on the available size, projection time, type of film and shipping weight is given for each film listed. Available films are listed under three headings: Motion pictures of general interest; motion pictures that promote Westinghouse products but are of general interest; and slide films and instruction courses.

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Every shipment that leaves the Twin Disc Factory is incomplete . . . only because the *service* that goes with each sale is delivered later . . . whenever and wherever it may be needed.

Twin Disc maintains 5 factory branches and 47 Parts Stations, located throughout the country, to provide speedy and efficient service. It is this policy of complete follow-up service that has given Twin Disc products the broad acceptance they enjoy among leading equipment manufacturers. Specify Twin Disc on your next power application. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).

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New Books

Structural Design in Metals, by Clifford D. Williams, head professor of civil engineering, University of Florida, and Ernest C. Harris, chairman, department of structural engineering Fenn College; cloth, 596 pages, 6½ x 9½ inches; published by Ronald Press Co., New York, N. Y., for $6.50.

Feeling that the basic training on the subject of structural steel design must be in the application of the statics of simple structurals, and the strength of materials, to the details of design, the authors have placed emphasis on the design of details rather than on the complete structure. They state that details, if properly designed, should be as applicable to one type of structure as another.

The book is written so that those with the equivalent education of the junior year in the average engineering college might comprehend it. An attempt is made to analyze both welded and riveted details in each phase of work, inasmuch as these processes of construction are now of nearly equal importance, it is stated.

A considerable number of line drawings, graphs and tables supplement the factual information presented. Six appendices contain standard specifications and codes for various types of structures, using various methods and materials. The book won first award in the structural design division of the competitive program for modernized textbooks on design, sponsored by James F. Lincoln Arc Welding Foundation.

—o—

Mines Register, Volume 23, edited by Dr. Joseph Zimmerman; cloth, 731 pages, 6¼ x 9¼ inches; published by Atlas Publishing Co. Inc., 425 West 25th, New York 1, N. Y.

Latest information on mining companies located in the western hemisphere that produced precious, semi-precious and base metals are included in this 23rd edition. A special section is devoted to a selective list of mining companies located in other parts of the world. Mining companies are listed alphabetically with as much detailed data as were available from the company itself or from reliable sources.

A glance at the table of contents reveals the following sections; Active mines; foreign mines; dormant mines; mining company officials, engineers, managers, superintendents and purchasing agents; industry statistics for the copper, gold, lead, silver and zinc industries; highs and lows of mining securities listed on leading exchanges in the United States and

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—o—

Elementary Metallurgy and Metallography, by Arthur M. Shrager, Brooklyn Technical High School; cloth, 297 pages, 6½ x 9½ inches; published by MacMillan Co., New York, for $4.75.

Intended to be an introduction to the metallurgy and metallography of the common metals and alloys, the book presents the subject matter in a form readily understandable to those without engineering training. The technical high school student with a background of 1 year of physics and 1 year of chemistry should be able to grasp the basic facts required for a general knowledge of metallurgy and thus be prepared to continue his reading in more advanced texts.

Technicians in such fields as heat treating, welding, foundry, etc., as well as mechanics, machinists, shop foreman and others will derive value from the book. Both underlying principles and techniques of modern metallurgy are covered, with much space given to the characteristics and uses of metals and alloys in the market of today. The physics and chemistry of metals are explained and the sources of metals and methods of extracting them from ores are described.

To further supplement the information given, the book has 134 photographs, line drawings and photomicrographs. Several tables, an extensive glossary and an index complete the volume.

—o—

Structure and Properties of Alloys, by R. M. Brick, professor of metallurgy and director, department of metallurgical engineering, University of Pennsylvania, and Arthur Phillips, professor of metallurgy, Yale University; cloth, 485 pages, 6½ x 9¼ inches; published by McGraw-Hill Book Co., New York, N. Y.

This second edition of the book is larger and includes much new material, discussion of new alloys, expansion of some sections for fuller understanding. New chapters on magnesium alloys and corrosion and heat resistant alloys have been added. The material in the nonferrous section has been expanded.

Chapters dealing with steel have been rewritten to achieve a more logical order of presentation and greater attention is given to isothermal and continuous cooling transformation diagrams. The number of micrographs is double that of the first edition and 64 tables and 116 new graphs are between its covers.

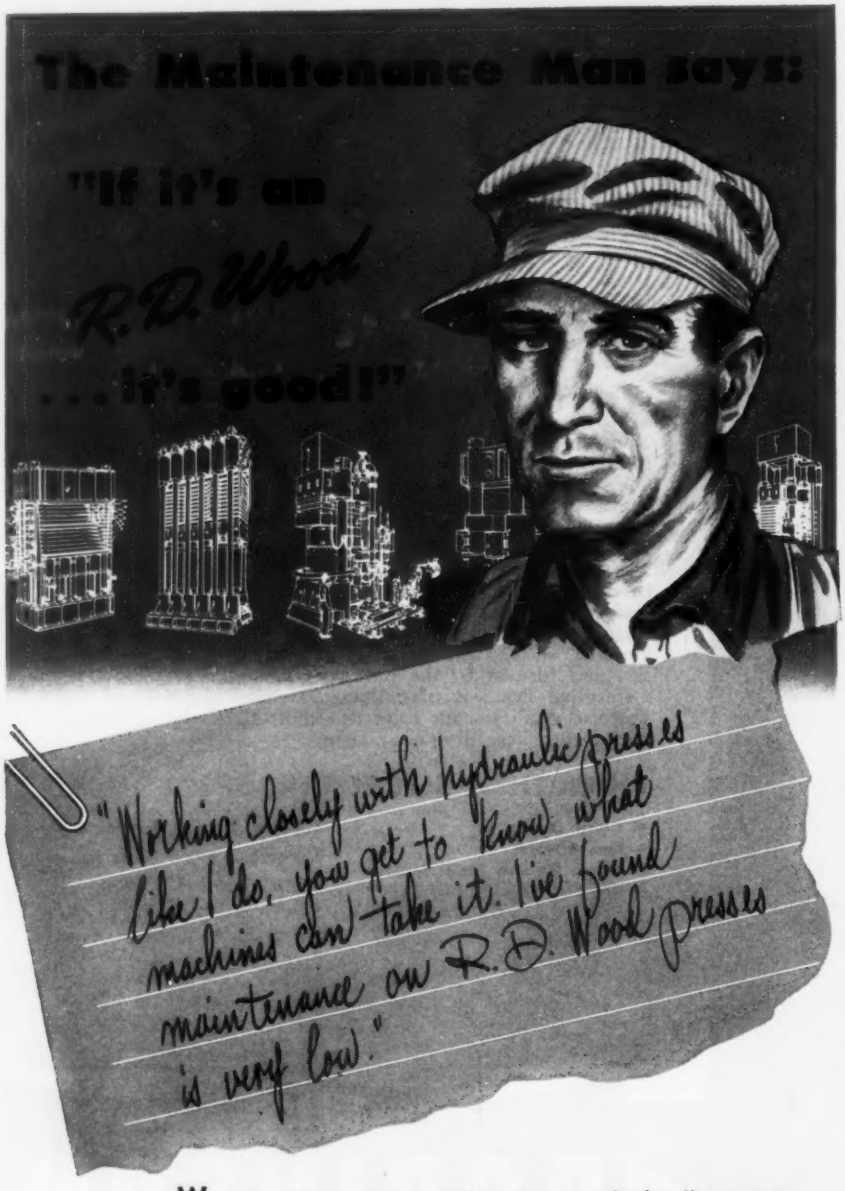
General approach of the first edition has been retained—the correlation of phase diagrams, structures and properties of alloys, proceeding in order from the simplest alloys to the most complex.

—o—

Constructive Uses of Atomic Energy, edited by S. C. Rothmann, research engineer, accident prevention department, Association of Casualty & Surety Companies, New York, N. Y.; published by Harper & Brothers, New York, N. Y.

Discussions by 14 scientists, including Arthur H. Compton, physicist and Nobel prize winner, and C. P. Rhoads, an authority on cancer research, are included in this book which relates the potential usefulness of atomic energy in a peacetime economy. The articles describe the everyday usefulness of atomic energy in such fields as industrial power, aviation, ceramics, chemistry and biology.

Use is made of photographs and drawings to illustrate the potentialities of this form of energy. A glossary defines in easily-understood terms the new words and phrases nuclear energy has added to our vocabulary. Recent publications are listed in a selected bibliography.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...it's good!"
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EST. 1803

R.D. Wood Company

New Products and Equipment

Lathe

Sheldon Machine Co. Inc., 4258 N. Knox Ave., Chicago 41, Ill., is announcing a new lathe which features a high ratio of through the spindle capacity to swing of 1⅜ to 10 inches. To build into this lathe the combination of large collet capacity and small size without loss of accuracy

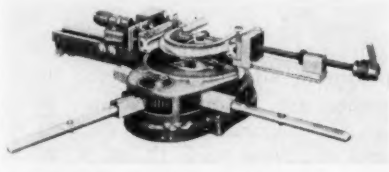
required a new headstock design and engineered arrangement of metal mass, as well as extensive tooling with special machines and jigs and fixtures.

Known as the XL series, the lathe is available with 38 or 44-inch bed length on a 3-drawer steel bench, or with a pedestal base in bed lengths up to 62 inches. A 4-speed motor drive provides eight spindle speeds. Other features include full double-walled, worm feed apron, quick-change gears, fully enclosed headstock and standard operator control.

Check No. 1 on Reply Card for more Details

Hand Tube Bender

Bending of tubing up to 3 inches in diameter is possible with the manually-operated model 848 tube bender manufactured by Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, O. Tube complements the



model G824 bender which has a capacity of 1½ inches OD tubing and uses the same accessory equipment. New bender will bend thin or heavy wall copper and aluminum alloy tubing and light or medium gage annealed steel tube.

Bender is operated by hand levers, actuating a central spindle and the attached radius block through gearing. Ratios of 30-1 or 8-1 may be chosen. Bends up to 180 degrees may be made, including offset and the U-bends in the middle of long tubes. Machine is reversible and the tube clamping and radius forming assemblies may be mounted on either side. Bend radius ranges from 1¼ to 12 inches.

Check No. 2 on Reply Card for more Details

Wheel Forming Instrument

A portable wheel-forming instrument which, tracing from templates, will form dress wheels to ten thousandths of an inch by means of a dressing diamond is offered by Pratt & Whitney Division, Niles-Bement-Pond Co., West Hartford 1, Conn. It operates on the pantograph principle, tracing from a 10 to 1 ratio

template. Attachment can be used on any horizontal spindle surface grinder.

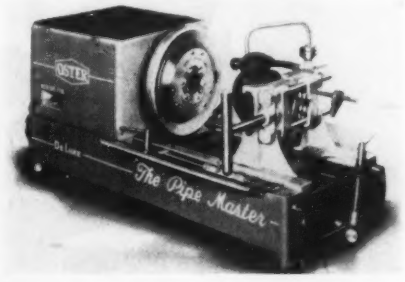
Major portions of the Diaform attachment are of aluminum alloy. It will form from dress to a depth of ½-inch on wheels up to 10 inches in diameter and 1 inch wide. For form tools greater than 1 inch in width, increments of its profile are successively dressed onto the wheel and the work piece advanced each time a corresponding amount until the form is complete. Templates are made from 3/32-inch flat metal stock.

Check No. 3 on Reply Card for more Details

Pipe, Bolt Threading Machine

Of aluminum construction, the No. 522 de luxe Pipe Master threading machine designed by Oster Mfg. Co., Cleveland 3, O., has a regular pipe range of ¼ to 2-inch pipe; an extra range of ⅛-inch pipe; an extended range of 2½ to 8-inch pipe when used with drive shaft and geared die-stock; and a bolt range of ¼ to 1½ inches. Machine is furnished with a universal geared head motor and safety switch for operation on 110 v, either ac single phase or dc (220 v operation is optional).

Two stationary, quick-opening adjustable die-heads are standard equipment, one die-head with two sets of dies covering a range of ¼ to ¾-

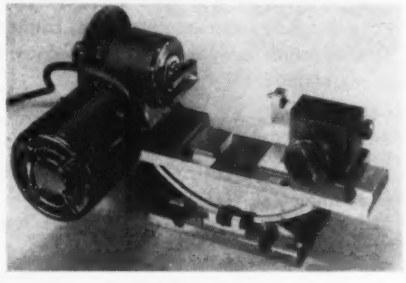


inch, the other die-head with two sets of dies covering the range from 1 to 2 inches. Spinfast front chuck eliminates the chuck wrench. Rear chuck is self-centering. A cut-off gage is calibrated for easy setting for any length of nipple up to 6 inches.

Check No. 4 on Reply Card for more Details

Motorized Centers

Flat, curved or circular work, straight taper and contour outlines, alone or in any combination, can be set up for grinding within 0.0005-inch with motorized centers developed by Moore Special Tool Co., Bridgeport 7, Conn. Tool may be used on surface grinders, jig borers, jig grinders, drill presses, light milling machines and as an inspection tool. The head-stock is equipped with a live



center and index plate with 24 holes, jig drilled to a tolerance of plus or minus 0.001-inch for spacing.

Overall length of motorized centers is 12 inches and width including motor is 10 inches. Head-stock is mounted on preloaded ball bearings. Equipped with a 1/25-hp motor, the complete unit weighs 34 pounds. All steps can be accomplished with the

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IN ONE YEAR with
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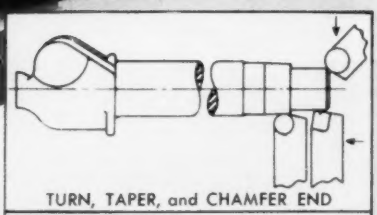
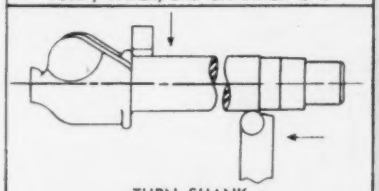

TURN, TAPER, and CHAMFER END


TURN SHANK

A manufacturer of automotive steering gears effected annual savings of $34,560.00 by using Kennametal tooling on just one series of machining operations.

Details of the job are given at the right —the basic tools used, Styles RAL and SBR, are illustrated above. This report indicates the enormous savings attainable through the application of modern tooling.

Here again Kennametal proves its worth. A few pennies saved in the initial cost means nothing. Consider these facts: (1) Fewer tools are required, as a rule; (2) Set-up and machine downtime are minimized; (3) Load and confusion in grinding room is reduced; (4) Higher production rates can be reached, and maintained.

Ask us to send you performance reports that show how other shops are achieving cost reduction by tooling with Kennametal.

The operations illustrated above required ten single-point brazed tools. Four Kennamatic tools are now being used. The savings on each 1000 pieces machined is $24.00, as detailed below. A total savings of $34,560.00 was realized over a 12-month period.

TOOL PERFORMANCE

	Single-Point	Kennamatic
Number Required	10	4
Cost Each (Avg.)	$2.50	$4.10
Pieces/Grind	200	1,600
Pieces/Tool Life	2,000	24,000

SHOP COST/1000 PIECES

	Single-Point	Kennamatic
Tool Cost	$15.00	$ 1.93
Productive Labor	15.12	9.32
Non-Productive Labor	6.00	0.87
Shop Cost/1000 pcs.	$36.12	$12.12

ROUGH FORGING

FINISHED

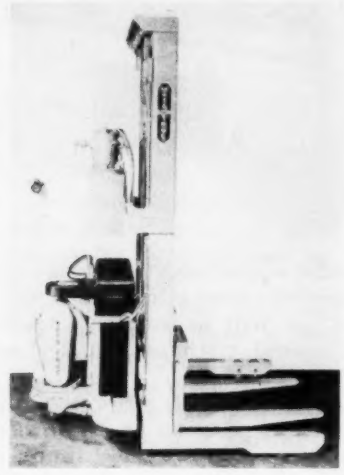
KENNAMETAL Inc.
LATROBE, PA.
MANUFACTURERS OF SUPERIOR CEMENTED CARBIDES AND CUTTING TOOLS THAT INCREASE PRODUCTIVITY

same set-up, since tapers can be reversed or changed by loosening two screws in the rocking bed and the indexing plate can be engaged by pressing a plunger.

Check No. 5 on Reply Card for more Details

Motorized Hand Truck

A load of 4000 pounds may be lifted to 80 inches or 2000 pounds lifted to 144 inches, depending upon the size of outriggers and fork width and length, on the improved motorized battery operated telescopic Hi-Lift walkie truck built by Moto-Truc Co., 1953 E. 59th St., Cleveland, O. By a turn of the wrist on the roller



type handle, the operator gets two speeds forward and two speeds reverse. Push buttons in the ends of the handle control the hydraulic lift.

Under-clearance of the truck is 2 inches from bottom of outrigger to the floor. Re-location of hydraulic pump and tank has permitted a 6 inch reduction in turning radius. Truck will operate in a 6-foot aisle with a 36 x 48-inch pallet. Distance from back to forks to front of motor unit is 33 inches.

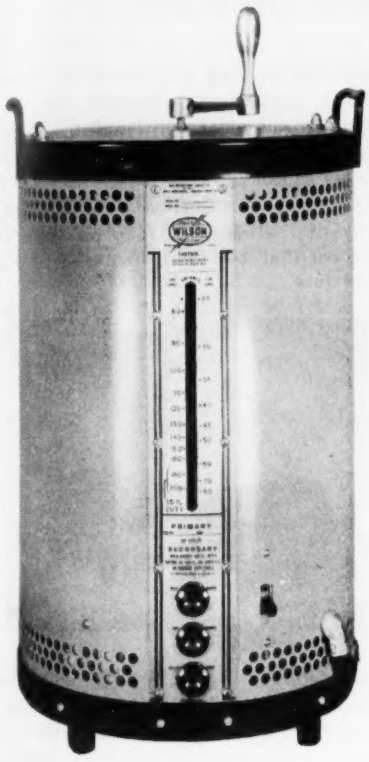
Check No. 6 on Reply Card for more Details

Arc Welder

Designed for small shops and maintenance operation is a 200 amp maximum alternating current transformer arc welding machine, made by Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y. Welding range of the Wilson machine is divided into two ranges of current adjustment with stepless control throughout each range. Any desired setting can be made quickly and accurately by turning the crank handle on the top of the machine.

Capacitors are supplied in the secondary circuit to provide easy arc starting and arc stability. Built-in

capacitors in the primary circuit provide power factor correction. Windings are fully insulated with heat-resistant spun-glass fibre. A primary



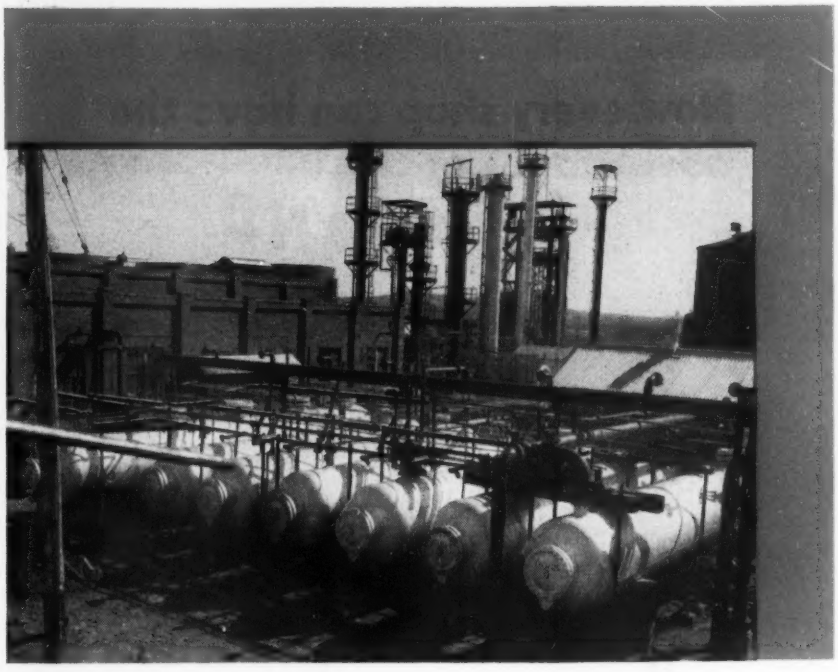
on and off switch and a 10-foot length of three-conductor rubber covered primary cable with lugs attached are included with the machine.

Check No. 7 on Reply Card for more Details

Cushion Cylinders

Cushioning of the piston stroke by compression of the displaced air or fluid is provided for the series 100 cylinders of 150 psi air and 300 psi oil capacity, made by Gerotor May Corp., Baltimore 3, Md. Cushion cylinders are standard units employing cushion units. A cushion plate attached to the cylinder cover blocks off the flow of exhaust air or fluid when a cushion bushing attached to the piston rod enters this mating cushion plate. Air or fluid displaced is compressed and metered out through adjustable needle valves.

One such valve, located in the blind end cover, controls the speed of the cushioning stroke when the piston rod is retracting. The other needle valve, located in the rod end cover, controls the speed of cushioning stroke when the piston rod is extending. Two check valves built into the cushion plates permit unrestricted flow of pressure into the cylinder. Units with cushioning strokes and a variety of mountings are offered in the following four



FIRE PROTECTION *Tailored* FOR INDUSTRY'S NEEDS

Not unlike the clothing industry, effective fire protection must be tailored to fit the need . . . tailored to each individual requirement—occupancy—hazard and risk. Recent advancements now make it technically and economically possible to handle problems of extreme hazard to personnel and to production continuity. A typical problem was the storage of propane at the illustrated refining operation. With the problem studied, the hazard analyzed and the measurements exactingly approved, specialized *Automatic* FIRE-FOG was installed and is today, ready, willing and able to combat fire at the first indication of flame.

Many installations of this and similar nature have been made in chemical processing properties throughout the country and, like any worth-while product, *Automatic* FIRE-FOG stands on its records of achievement . . . records which are written into the reports of all leading fire insurance bureaus.

Whether your needs call for *Automatic Sprinklers* chemical or mechanical foam, CO_2 gas, *Automatic* FIRE-FOG or a combination system of protection, our preliminary engineering service now makes it possible to fairly evaluate the economic and adaptability features of each method for your own risk. Detailed information is available upon request. Write or call today.

Automatic FIRE-FOG
IT BLANKETS - IT ISOLATES - IT QUENCHES

. . . a famous member of the *Automatic Sprinkler* Family . . . provides basic fire protection for process equipment and storage in the chemical and petroleum industries. On-the-spot protection for quench tanks, dryers, explosive hazards, conveyor openings, air filters, oil filled electrical equipment and other units vital to production line operations.

"AUTOMATIC" SPRINKLER CORP. OF AMERICA
YOUNGSTOWN 1, OHIO

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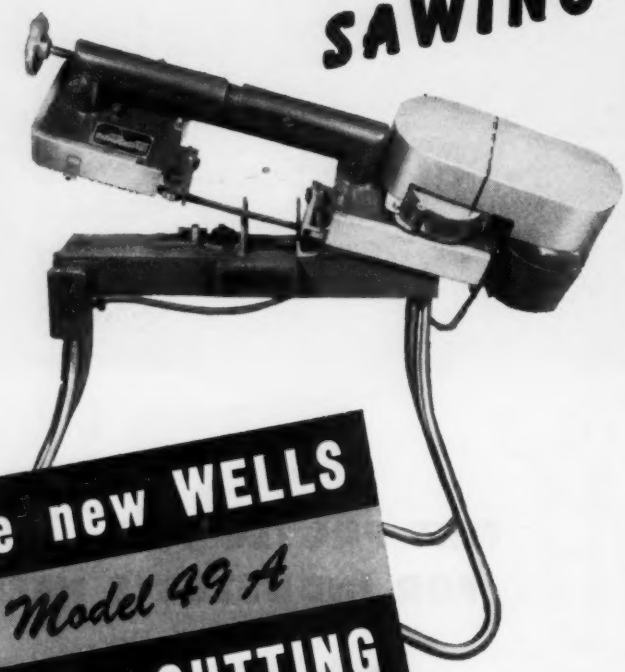
FIRST IN FIRE PROTECTION
DEVELOPMENT · ENGINEERING MANUFACTURE · INSTALLATION
OFFICES IN PRINCIPAL CITIES OF NORTH AND SOUTH AMERICA

Now every shop can have the advantages of

BAND SAWING



The new WELLS Model 49A METAL CUTTING BAND SAW

See this unit in action at the Metal Show

No longer does any shop need be without the advantages of band sawing for metal cut-off work. The new Wells Model 49A fits the smallest shop's budget, yet it does a man-sized job in any plant. From its welded steel frame to its tubular steel base, the Wells Model 49A is a rugged shop tool that will give long, dependable service. Its portability is unequalled. Easy to operate without special training, the Model 49A can be used by anyone in the shop. Automatic shut-off at the end of the cut eliminates the need for the operator to stand by. The continuous cutting action, utilizing every tooth of the band saw blade, means more economical cutting too. Write for complete details, today.

DESIGN DETAILS

Capacity: Rectangular, 3½" x 6⅝"; Rounds, 3½" diameter.
Blade: Size—½" x .025" x 5'
Motor: 1/6 HP, Ball Bearing—foot mounting.
Speeds: Selective (belt change) 54, 100, 190 f.p.m.
Drive: "V" Belt.
Vise: Quick action.
Blade Guides: Stationary brackets with adjustable blade guides.
Wheels: Disc type idler and drive wheels, mounted on grease-sealed ball bearings.
Blade Tension: Incorporated in frame design.
Switch: Manual — automatic stop.
Height to top of Bed: 24"
Bed Area: 6½" x 24"
Floor Space: 16½" x 38"
Net Weight: Approx. 118 lbs.

Wells Saws

Wells

Products by Wells are Practical

METAL CUTTING BAND SAWS

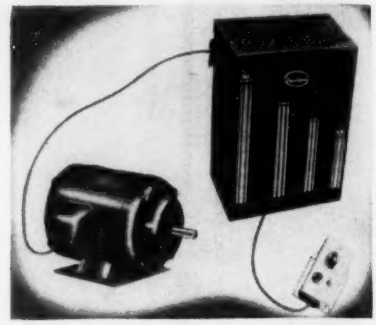
WELLS MANUFACTURING CORPORATION
1515 FILLMORE ST., THREE RIVERS, MICHIGAN

sizes: 1½, 2, 2½, 3, 4½, 6, 8, 10 and 12 inches.

Check No. 8 on Reply Card for more Details

Motor Control Unit

Remote stepless speed adjustment and control may be applied to fractional horsepower motors by the Dyna-Speed electronic motor control unit offered by Brown-Brockmeyer Co., Dayton 1, O. Equipment consists of a rectifier cabinet, a direct current ball-bearing motor, remote control dial box and 10 feet of connecting cable. By setting the speed control dial knob, any speed within a range greater than 20 and 1 (80-1800 rpm) can be maintained substantially constant regardless of load changes.



Constant torque is also maintained over the entire speed range. Motor speed can be adjusted instantly by the operator at considerable distance from the motor. Both the armature and field of the motor are supplied with power from a full wave gaseous rectifier. An idle switch on the control box can be used to turn the motor on and off without changing speed setting. Equipment is available in ratings of ¼ and ½ hp.

Check No. 9 on Reply Card for more Details

Beta Gage

A source of beta radiation from strontium-90 and a radiation detector are the essential components of a beta gage offered by Tracerlab Inc., 55 Oliver St., Boston, Mass. Sheet metal to be measured is interposed between the source and the detector and a part of the radiation is absorbed by the sheet material in proportion to its weight per unit area. Weight per unit area or thickness is read on a properly calibrated recorder connected to the detector, scale of which can be calibrated in terms of a plus or minus deviation from specifications or as an absolute thickness or weight reading.

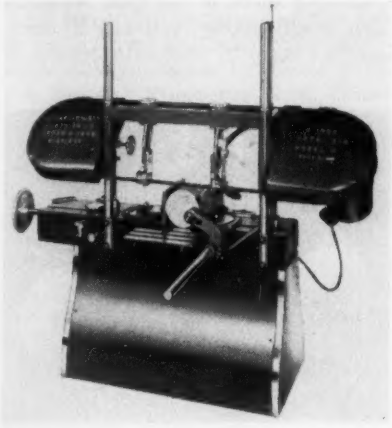
For all practical purposes the chemical composition of the sheet being measured does not affect the cali-

bration of the instrument. The model SM-2 gage uses a Brown Electronik recorder and the gage standardizes itself completely automatically every 30 minutes. Accuracy of the gage is plus or minus 0.05 per cent of sample thickness.

Check No. 10 on Reply Card for more Details

Metal Cutting Saw

Designed to fit the requirements of most cutting jobs, the 9-inch metal cutting saw made by W. F. Wells & Sons, Three Rivers, Mich., will also do many milling and planing operations, such as slotting, removing corners of die blocks, etc. The machine raises and lowers hydraulically. Capacity of the saw is 9 x 18 inches and maximum clearance under the saw blade is 20 inches. All rotating parts operate on ball bearings.



Cutting head is one piece welded construction which includes beams for blade guides and column housing. A stock stop automatically moves out and up at completion of cut, to eliminate binding of stock on blade. When a cut is completed, the machine will stop at a selected height or it may be set for a repeating cycle. Available as optional equipment are a 12-inch steel roller stock stand, a cooling system and a rotary base for cutting angles.

Check No. 11 on Reply Card for more Details

Dust Collector

Surface of the aerodynamic dust collector offered by Aerodyne Development Corp., 901 Leader Bldg., Cleveland 14, O., consists of a specially slotted sheet bent into the form of a cone. The air or gas to be cleaned is passed at high velocity over this surface and due to the form of the slots, aerodynamic forces are set up. Resultant force on the dust particles is in a direction away from the cone face, this force keeping the

"Hmm! An INSIDE job, Plunkett!"

Yes indeed! . . and an inside job by Thomas! *For every strip steel fabricator knows that you simply can't do a proper plating job on inside surfaces of tubular forms or deep drawn stampings. It has to be done by* pre-coating!

★ ★ ★

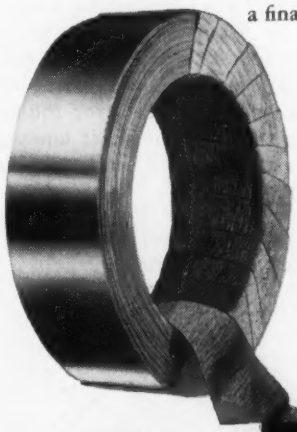
And *inside* or outside, you can depend on Thomas Strip always. Why? . . . First, the base steel is controlled by Thomas—to both your product and process requirements to assure quality and saleability. Second, the *pre-coat*—copper, brass, nickel, zinc, tin, chrome, or lacquer in colors—is so unitized with the steel in the exclusive Thomas process, that it will not peel, crack, chip or flake. With reasonable care, it will not damage in process and provides a final finish with real sell-appeal. It is uniform—on inside and outside surfaces alike—presenting no thin spots anywhere to bedevil quality control.

★ ★ ★

You can speed production, step up quality and efficiency—*and profits*—by using Thomas Strip. Cut your process down to its two essential steps—fabrication and assembly—and eliminate the others, with *pre-coated* Thomas Strip. Why not try it out? Thomas metallurgists will gladly talk over your problems with you—not obligating you in the least! Write today to:

THE THOMAS STEEL COMPANY
WARREN, OHIO

Specialists in Cold Rolled Strip Steel

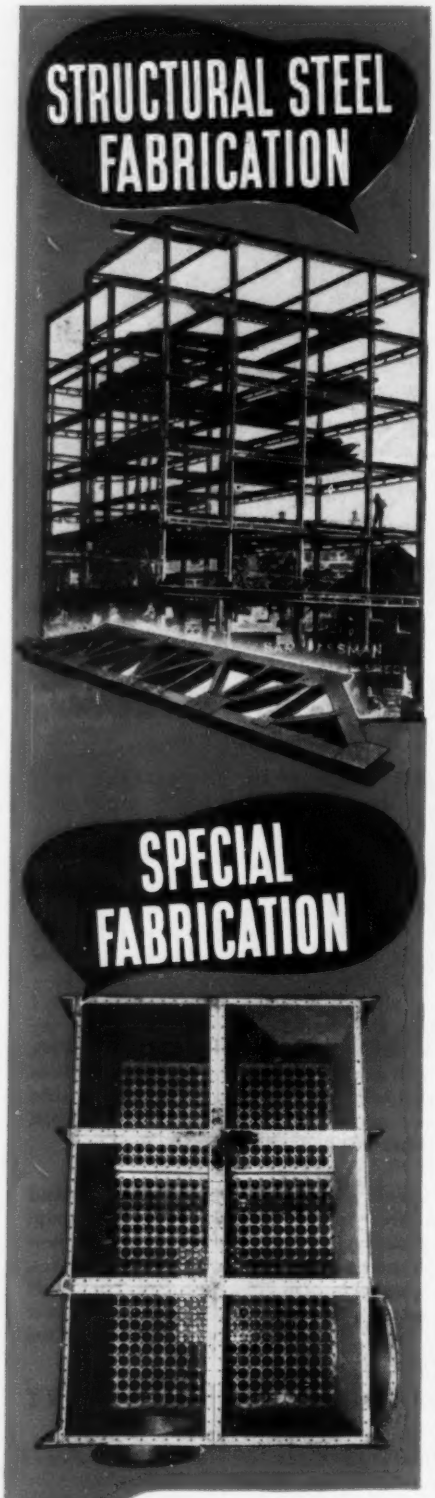


COLD ROLLED STRIP STEEL

Electrocoated with Chromium, Nickel, Copper, Zinc and Brass • Hot Dipped Tin and Lead Alloy • Lacquer Coated in Colors • Annealed and Tempered Spring Steel • Alloy Strip Steel • Uncoated Strip Steel • Produced to Your Specifications.

Thomas Strip

SPEEDS PRODUCTION . . . CUTS COSTS


STRUCTURAL STEEL FABRICATION
SPECIAL FABRICATION
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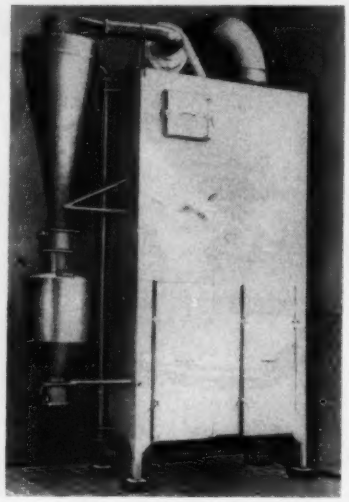
LS-2

dust particles suspended in the form of a thin cloud layer immediately in front of the filter surface while the clean air escapes through the slots.

Dust layer is carried at high speed to the outlet end of the cone where it is continuously withdrawn with a very small percentage of the air or



gas into a secondary circuit. Concentrated dust mixture is then passed through a small collector for precipitation into a suitable container, the secondary air or gas being returned to the inlet of the cone where it again passes through the same process.

Check No. 12 on Reply Card for more Details

Scrap Chopper

An automatic scrap chopper, manufactured by Wenthe-Davidson Engineering Co., 1459 N. 31st St., Milwaukee 8, Wis., produces uniformly cut 1½-inch pieces suited for foundry use. In this size, the exact amount of scrap to be added to a heat can be

weighed out and easily shoveled into the furnace or cupola. Chopping unit occupies 5½ x 2½ feet of floor space. Removable cutting knife of hardened tool steel rotates at 72 rpm.

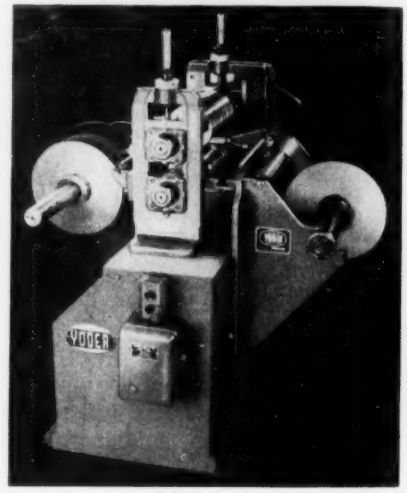
Machine is equipped with a welded steel hopper type floor truck which is rolled under the machine to receive the scrap as it is cut. When filled, it holds the equivalent of one ton of scrap. Any metal scrap up to ¼-inch thick can be handled.

Check No. 13 on Reply Card for more Details

Coil Slitter

Yoder Co., 5500 Walworth Ave., Cleveland, Ohio, is manufacturing a slitter for coils up to 250 pounds and stock thickness up to 0.062-inch. Machine is equipped on the entry side with a coil holder for unwinding and on the exit side with a recoiler for rewinding the slit strands. Sleeves are provided for the recoiler shaft for the purpose of rewinding strands into coils of different core diameters.

Slitting speed is 150 fpm. An entry table is adjustable vertically to maintain the strip in line with cutters of



any diameter between 5 and 8 inches. On it are mounted the removable coil holding shaft, a horizontal idle roller and a pair of side guides, the latter adjustable for different strip widths. Slitter has alloy steel cutter arbors, surface hardened and ground, micrometer dial-equipped screws for quick adjustment of the top arbor and maintenance of parallelism.

Check No. 14 on Reply Card for more Details

Hoist Equipment

Announced by General Electric Co., Schenectady 5, N. Y., is a new direct current two-shoe, two-magnet brake and a new direct current crane hoist control. Brake is designed for use on steel mill drives, cranes, hoists, bridges, conveyors and for general marine service. Control is intended for use on whirley, revolver, gantry and overhead cranes in steel mills, shipyards, etc. Brake, applicable for either right or left hand mounting, either on the floor or with brackets,

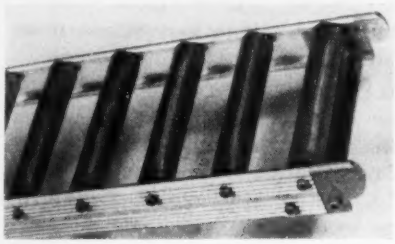
on motors, has a torque-setting indicator which gives a direct reading of foot pounds torque setting.

Hoist control provides power hoisting and power dynamic lowering, depending upon the requirements of the load on the hook. Change from power to dynamic braking lowering is inherent in the control and hence is independent of operator or control device. When decelerating the speed is reduced automatically before the solenoid brake sets, thus minimizing mechanical brake maintenance and protecting motors and hoist equipment. Both overshoot and down drift are eliminated.

Check No. 15 on Reply Card for more Details

Roller Conveyor

All structural members of the new line of lightweight, solid roller aluminum conveyor, made by Arrow Products Inc., 417 Front Ave. N.W., Grand Rapids, Mich., are of heat-treated aluminum alloy extrusions. Rollers are of impact-resisting, drawn aluminum tubing, 1½ inches in diameter. They are mounted on heavy duty



bearings and rollers are available on either 3½ or 7 inch centers.

Both 12 and 18-inch wide conveyors are offered, both coupling to the Arr-O-Lite all-aluminum wheel conveyor made by the company. Available are 3, 5 and 8-foot standard sections and 45 and 90-degree, 4 foot radius, two lane curves. Weight is 29 pounds per 8-foot section.

Check No. 16 on Reply Card for more Details

Electronic Heat Controls

Electronic heat controls for spot and projection welders are being offered in separate enclosures by Square D Co., 4041 N. Richards St., Milwaukee 12, Wis. Styling and dimensions of enclosures match electronic contactors or nonsynchronous electronic timer-contactor combination controls. Class 8990 heat controls provide stepless adjustment of welding current from 20 to 100 per cent on 440 v systems or from 40 to 100 per cent on 220 v systems.

Tubes, warm-up timing relay, and all circuit components excepting a large capacitor and transformers, are

= NO Down-Time

Plant Superintendent looks at

MONARCH SOLID TIRES

No down time for tire maintenance—right! But that's only part of the story. Monarch Solid Tires have an extra long service life, so they lower materials handling costs that way, too. They're tough, stable, sure-footed, and they can't puncture—Monarch-equipped vehicles go anywhere in the plant.

Monarch specialization pays off for you in better industrial tires, including such special types as Monarch Easy-Roll, Cushion, Static Conductor, and Neoprene Tires.

Write for specific information on the use of Monarch Solid Tires in your plant. THE MONARCH RUBBER CO., 300 Lincoln Park, HARTVILLE, OHIO.

Specify Monarch Solid Tires on your industrial vehicles. Replacement tires available from the manufacturer of your equipment.

MONARCH

Specialists in Industrial Solid Tires and Molded Mechanical Rubber Goods

plainly visible when the enclosure door is opened. Adjustor dial is covered by a small door which can be locked to eliminate tampering. Choice of ignitor firing tubes gives warm-up time of less than 1 minute. Adjustor rheostat may be removed from the control and separately mounted.

Check No. 17 on Reply Card for more Details

Nonrepeat Safety Device

Acting as a secondary clutch is a non-repeat device for small bench presses or large floor presses, a product of Searjeant Metal Products Inc., 89 Allen St., Rochester 6, N. Y. Downward action of the press ram releases this clutch, allowing the upper portion of the treadle rod to disengage the primary clutch on the press flywheel. Should the press operator continue to hold the treadle down, the press will not repeat until the operator has brought the treadle to the up position. This action will reengage the clutch in the non-repeat device.

Check No. 18 on Reply Card for more Details

• • •

SOLDERING FLUXES: American Chemical Paint Co., Ambler, Pa., offers Flosol soldering fluxes that wet oily surfaces, clean and flux. They are used in the soldering of sheet metal and other products of carbon and stainless steels, brass, copper, tin, terne plate, zinc and galvanized iron. Various grades are available in liquid, paste and cream.

Check No. 19 on Reply Card for more Details

RELAY: Designated as type DO, a power relay available in contact combinations up to 4-pole, double throw, is announced by American Relay & Controls Inc., Chicago 44, Ill. Contact rating is nominally 10 amp at 115 v ac noninductive, or 10 amp at 32 v dc noninductive. Coils are available for continuous duty for operation up to 230 v ac at 60 cycles, or 115 v dc.

Check No. 20 on Reply Card for more Details

PLUGS: U. S. Plug & Fitting Co., Canton, O., offers a line of magnetic plugs ranging in size from ¼ to 1½ inches in standard square head, countersunk and special designs. Plugs will effectively remove and hold ferrous metal particles from a moving lubricant.

Check No. 21 on Reply Card for more Details

HOT PLATE: Temperature range of the new hot plate announced by Thermo Electric Mfg. Co., Dubuque, Iowa, is 140 to 850° F (60 to 455° C). For use in the laboratory or plant for evaporations, boiling and general heating, it is controlled by a patented input controller that is automatically compensating for line voltage variations and maintains the working temperature desired to close limits.

Check No. 22 on Reply Card for more Details

SPEED CONTROL UNIT: Reeves Pulley Co., Columbus, Ind., offers Vari-Speed Jr., a variable speed control unit to provide accurate and dependable control for small and light machinery without stopping the machines. It is made in six sizes for use with any standard constant speed motor up to 1½ hp and for any A or B V-belt.

Check No. 23 on Reply Card for more Details

ELECTRODE DRESSERS: Model 7165 electrode dresser, announced by Aro Equipment Corp., Bryan, O., has a cutting speed of 1200 rpm. It is equipped with a cutter for reshaping copper electrodes on spot welding machines without removing tips from the machine.

Check No. 24 on Reply Card for more Details

SHOT: Life of Cutwire shot, introduced by Precision Shot Co., Detroit 2, Mich., is said to be 1500 cycles. It is made from high quality SAE 1065 wire for high tensile strength, hardness (46-52 Rockwell), and maximum fatigue resistance. It is available in 0.014 to 0.072-inch diameters.

Check No. 25 on Reply Card for more Details

REFRIGERATED BATH: Fisher Scientific Co., Pittsburgh 19, Pa., announces a rerfigerated bath for use in steel or metallurgical laboratories for cooling volumetric test samples. It is a copper-lined steel cabinet with tray adjustable by supporting chains over height of 10 inches.

Check No. 26 on Reply Card for more Details

COATING: Munray Products Inc., Cleveland 11, O., announces a new corrosion resistant, nonoxidizing plastic coating, Cyclon series WPS. It is for the protection of all types of metals that are subjected to extreme corrosive conditions, particularly where direct immersion in the corrosive medium is a necessary applicational factor.

Check No. 27 on Reply Card for more Details

DEHYDRATOR: Model RD-8080 filter dehydrator, available from Lear Inc., Elyria, O., is adaptable for moisture-free pressurizing of engine ignition harness and for many vacuum or pressure processing systems requiring dry air. Transparent tubes contain grade A high adsorption capacity silica gel of the relative humidity indicating type. Characteristic colors of silica gel coincide with an attached humidity indicating color card at 0, 20, 40 and 60 per cent relative humidity.

Check No. 28 on Reply Card for more Details

BLOWER: Incorporating a combined electric motor and steam turbine drive, a new forced draft blower is announced by L. J. Wing Mfg. Co., New York, N. Y. A change from one drive to another can be made at will. Wide range of control is available with both drives.

Check No. 29 on Reply Card for more Details

PRESS: Called the Ham-R-Press, a new hand operated press for use with mating tools of the punch and die type is introduced by Pioneer Broach Co., Los Angeles, Calif. Principle of operation is transmission of hammer pressure through the vertical ram directly to the working point. Four models are available with 5, 7½, 12 and 24-inch depth of throat.

Check No. 30 on Reply Card for more Details

DIAPHRAGM: Development of a new plastic diaphragm for use in Hills-McCanna Saunders patent diaphragm valves is announced by Hills-McCanna Co., Chicago 18, Ill. Valves are available in sizes from ½-inch to 4 inches, with a choice of cast iron, cast steel, Durimet, or glass lined bodies. All but glass lined will be available with flanged or screwed ends; they will have only flanged ends.

Check No. 31 on Reply Card for more Details

VALVE: C. B. Hunt & Son Inc., Salem, O., introduces a new line of double piloted, single plunger valves. Pilot cylinder can be operated at pressures as low as 25 psi, permitting use of valves at most instrument air pressures and making them suited for use in safety control arrangements on presses, shears, cutters, etc., for air clutches and sequence operating cycles.

Check No. 32 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

UNSETTLED labor relations are contributing renewed pressure for steel deliveries. After several weeks during which protective buying appeared tapering, last week additional precautionary demand developed from consumers hoping to obtain shipments before the new Sept. 25 steel strike deadline. At the same time, deteriorating labor relations in the soft coal industry are serving to stimulate steel ordering since should a mine strike be experienced curtailment in steelmaking operations is to be expected. In general, the air of cautious optimism that has pervaded the steel markets over past weeks, at the moment, seems to be giving way to a new wave of uncertainty.

LABOR—Until the big questions surrounding labor developments are definitely removed the steel markets are bound to be shrouded in a haze of uncertainty. Generally, the current steel dispute is expected to be amicably resolved despite the heat being generated in the arguments of the parties concerned. Both producers and workers are anxious to avoid a work stoppage. Consequently, it is believed mutual basis for settlement of the steel pension and insurance issues will be found before the new strike deadline. The same cannot be said with respect to coal, however, especially considering the unpredictable John L. Lewis and the stranglehold he has on that industry.

DEMAND— Meanwhile, aside from precautionary buying, demand for steel appears to be running along at a slightly slower pace than in the past several weeks. Except for flat-rolled products and pipe, ordering cannot be described as strong although seasonal expansion in consumption is noted in some directions.

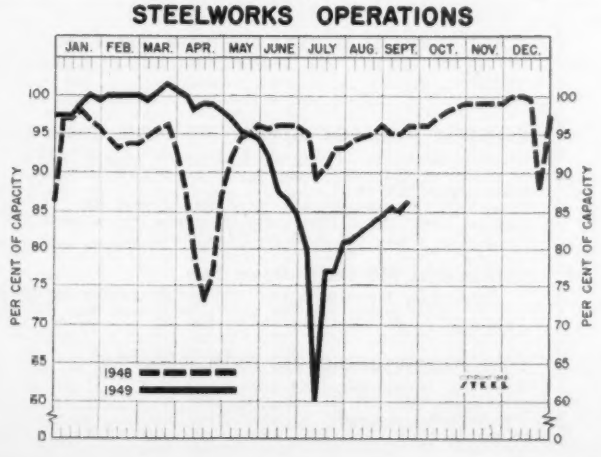
SUPPLY— Reports of excessive consumer inventories here and there are heard but such appear to be exceptions since increasing complaints to mills of delayed deliveries on old commitments, especially flat-rolled items, would seem to indicate inventories in a good many instances are below safe levels. Plates are in spotty demand and available for early shipment. Structural shape orders are scattered and, in general, fabricating shops' backlogs are declining. Stringency continues in cold-rolled and galvanized sheets, which, with the exception of pipe, appear to be in shortest supply of all major steel items. Fourth quarter capacity in these products is largely taken up, with some producers allocating both items. Hot carbon bar supply is somewhat tighter than a month ago, but leading sellers offer three to four-week delivery.

SCRAP, PIG IRON— Undertone of the scrap market is strong with prices tending upward despite absence of spirited consumer buying. Brokers are bidding the market up in an effort to cover past sales. The upturn in scrap in the face of comparatively slack demand has the trade puzzled and there is no question it is generating increased attention from the mills. Last week all the signs pointed to increased use of hot metal by the steelmakers in place of scrap. Also, renewed interest in foreign scrap on the part of the steel mills was reported. Pig iron demand is definitely stronger. Some sellers report September releases of foundry grade iron considerably above those in August.

OPERATIONS— Steelmaking operations turned upward last week as a result of the extension of the truce in the labor dispute. Estimated national ingot rate rose 1½ points to 86.5 per cent of capacity, highest level in three months.

PRICES—STEEL's weighted index of finished steel prices is 152.52 compared with 151.86 for the like week a year ago. The composite price average on steelmaking scrap continued to rise, now being $26.92 compared with $25.17 a week ago, and $43.33 a year ago. Other composite price averages held unchanged and compared with those a year ago as follows: No. 2 foundry iron, $46.10 and $44.44; malleable pig iron, $47.47 and $44.84; steelmaking iron, $45.60 and $44.38.

STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Sept. 17	Change	Same Week 1948	Same Week 1947
Pittsburgh	83	+ 3.5*	93.5	80.5
Chicago	92.5	+ 0.5*	96	92.5
Eastern Pa.	80	— 1	93	92
Youngstown	95	+ 1	103	92
Wheeling	96	+ 6	95	93.5
Cleveland	97.5	— 2*	90	92.5
Buffalo	98.5	None	104	88.5
Birmingham	100	None	100	99
New England	74	— 3	83	85
Cincinnati	96	+ 1	102	94
St. Louis	89.5	+ 2.5	91.5	78
Detroit	92	None	100	91
Western	76	— 6	..	..
Estimated national rate	86.5	+ 1.5	96	87.5

Based on weekly steelmaking capacity of 1,843,516 net tons for 1949; 1,802,476 net tons for 1948; 1,749,928 tons for 1947. *From revised rate.

News Summary—P. 41 Engineering News—P. 71

Composite Market Averages

	Sept. 15 1949	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Finished Steel:					
Index (1935-39 av.=100)	152.52	152.52	152.52	151.86	99.16
Index, cents per pound..	4.132	4.132	4.132	4.114	2.686
No. 2 Fdry Pig Iron, GT..	$46.10	$46.10	$46.10	$44.44	$23.67
Malleable Pig Iron, GT....	47.27	47.27	47.27	44.84	24.29
Basic Pig Iron, GT.....	45.60	45.60	45.60	44.38	23.00
Steelmaking Scrap, GT....	26.92	25.17	21.92	43.33	18.41

Finished steel index based on average shipments and prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Sept. 15 1949	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pitts.	3.35	3.35	3.35	3.45	2.15
Bars, H.R., del. Phila.	3.83	3.83	3.8164	3.79	2.47
Bars, H.R., Chicago	3.35	3.35	3.35	3.35	2.15
Bars, C.F., Pitts.	3.95-4.00	3.95-4.00	3.95-4.00	3.95-4.25	2.65
Bars, C.F., Chicago	4.00	4.00	4.00	4.00	2.65
Shapes, Std., Pitts.	3.25	3.25	3.25	3.25	2.10
Shapes, Std., Chicago	3.25	3.25	3.25	3.25	2.10
Shapes, del. Phila.	3.50	3.50	3.4918	3.48	2.215
Plates, Pittsburgh	3.40	3.40	3.40	3.50	2.10
Plates, Chicago	3.40	3.40	3.40	3.40	2.10
Plates, Coatesville, Pa.	3.50	3.50	3.50	3.75	2.10
Plates, Sparrows Point, Md.	3.40	3.40	3.40	3.45	2.10
Plates, Claymont, Del.	3.50	3.50	3.50	3.95	2.10
Plates, del. Phila.	3.59	3.59	3.5848	3.71	2.15
Sheets, H.R., Pitts.	3.25	3.25	3.25	3.275	2.10
Sheets, H.R., Chicago	3.25	3.25	3.25	3.25	2.10
Sheets, C.R., Pitts.	4.00	4.00	4.00	4.00	3.05
Sheets, C.R., Chicago	4.00	4.00	4.00	4.00	3.05
Sheets, C.R., Detroit	4.20	4.20	4.20	4.20	3.15
Sheets, Galv., Pitts.	4.40	4.40	4.40	4.40	3.50
Strip, H.R., Pitts.	3.25	3.25	3.25	3.275	2.10
Strip, H.R., Chicago	3.25	3.25	3.25	3.275	2.10
Strip, C.R., Pitts.	4.00	4.00	4.00	4.00	2.80
Strip, C.R., Chicago	4.00-15	4.00-15	4.00-15	4.00-25	2.90
Strip, C.R., Detroit	4.20-25	4.20-25	4.20-25	4.20	2.90
Wire, Basic, Pitts.	4.15	4.15	4.15	4.15	2.60
Nails, Wire, Pitts.	5.15	5.15	5.15	5.20	2.55
Tin plate, box, Pitts.	$7.75	$7.75	$7.75	$6.70	$5.00

SEMIFINISHED

Billets, forging, Pitts.(NT)	$61.00	$61.00	$61.00	$61.00	$40.00
Wire rods, 7/32-⅜", Pitts.	3.40	3.40	3.40	3.40	2.00

PIG IRON, Gross Ton

Bessemer, Pitts.	$47.00	$47.00	$47.00	$45.50	$24.00
Basic, Valley	46.00	46.00	46.00	43.00	23.50
Basic, del. Phila.	49.44	49.44	49.39	46.17	25.34
No. 2 Fdry, Pitts.	46.50	46.50	46.50	45.00	24.00
No. 2 Fdry, Chicago	46.50	46.50	46.50	43.25	24.00
No. 2 Fdry, Valley	46.50	46.50	46.50	43.50	24.00
No. 2 Fdry, del. Phila.	49.94	49.94	49.89	46.67	25.84
No. 2 Fdry, Birmingham	39.38	39.38	39.38	43.38	20.38
Malleable, Valley	46.50	46.50	46.50	43.50	24.00
Malleable, Chicago	46.50	46.50	46.50	43.50	24.00
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	62.00	33.00
Ferromanganese, Etna, Pa.	175.00	175.00	175.00	148.00	135.00

SCRAP, Gross Ton

No. 1 Heavy Melt, Pitts.	$29.75	$23.00	$27.00	$42.75	$20.00
No. 1 Heavy Melt. E. Pa.	24.50	24.00	17.50	45.50	17.00
No. 1 Heavy Melt, Chicago	26.50	24.50	21.50	41.75	18.75
No. 1 Heavy Melt, Valley	29.50	26.50	19.50	42.75	20.00
No. 1 Heavy Melt, Cleve.	25.00	23.00	15.75	42.25	19.50
No. 1 Heavy Melt, Buffalo	26.25	26.25	24.25	47.50	19.25
Rails, Rerolling, Chicago	41.50	38.50	34.50	64.25	22.25
No. 1 Cast, Chicago	41.50	40.50	34.00	70.00	20.00

COKE, Gross Ton

Beehive, Furn., Connlsvl.	$13.25	$13.25	$13.25	$14.50	$7.00
Beehive, Fdry., Connlsvl.	15.75	15.75	15.75	17.00	7.75
Oven, Fdry, Chicago	20.00	20.00	20.00	20.40	13.35

NONFERROUS METALS

Copper, del. Conn.	17.625	17.625	17.625	23.50	12.00
Zinc, E. St. Louis	10.00	10.00	10.00	15.00	8.25
Lead, St. Louis	14.925	14.925	12.85	19.30-35	6.35
Tin, New York	103.00	103.00	103.00	103.00	52.00
Aluminum, del.	17.00	17.00	17.00	16.50	15.00
Antimony, Laredo, Tex.	38.50	38.50	38.50	35.00	14.50
Nickel, refinery, duty paid	40.00	40.00	40.00	40.00	35.00

Pig Iron

For key to producing companies, turn next page.

PIG IRON, Gross Ton	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$48.00	$48.50	$49.00	$49.50
Newark,del.	50.63	51.13	51.13	52.13
Brooklyn,N.Y.,del.	....	52.79	53.29	....
Birmingham District				
Birmingham,Ala. R2, S9	38.88	39.38	....	....
Woodward,Ala. W15	38.88	39.38	....	....
Buffalo District				
Buffalo H1, R2	46.00	46.50	47.00	....
Tonawanda,N.Y. W12	46.00	46.50	47.00	....
N.Tonawanda,N.Y. T9	....	46.50	47.00	....
Boston, del.	55.26	55.76	56.26	....
Rochester,N.Y., del.	48.63	49.13	49.63	....
Syracuse,N.Y., del	49.58	50.08	50.58	....
Chicago District				
Chicago I3	46.00	46.50	46.50	47.00
Gary,Ind. C3	46.00	....	46.50	....
IndianaHarbor,Ind. I2	46.00	....	46.50	....
So.Chicago,Ill. W14	46.00	46.50	46.50	....
So.Chicago,Ill. C3	46.00	....	46.50	47.00
So.Chicago,Ill. Y1	46.00	46.50	46.50	....
Milwaukee,del.	47.89	48.39	48.39	48.89
Muskegon,Mich.del.	....	51.98	51.98	....
Cleveland District				
Cleveland A7	46.00	46.50	46.50	47.00
Cleveland R2	46.00	46.50	46.50	....
Lorain,O. N3	46.00	....	....	47.00
Akron, del. from Cleve.	48.39	48.89	48.89	49.39
Duluth I3	....	....	46.50	....
Erie,Pa. I3	46.00	46.50	46.50	47.00
Everett,Mass. E1	....	50.00	50.50	....
Geneva,Utah G1	46.00	46.50	....	....
Seattle,Tacoma,Wash.,del.	....	54.20	....	....
Portland,Oreg.,del.	....	54.20	....	....
LosAng.,SanFrancisco,del.	53.70	54.20	....	....
GraniteCity,Ill. M10	47.90	48.40	48.90	....
St.Louis,del.(incl. tax)	48.65	49.15	49.65	....
Ironton,Utah C11	46.00	46.50	....	....
LoneStar,Tex. L6	46.00	*46.50	....	....
Gulf ports, del.	50.50	51.00	....	....
Minnequa,Colo. C10	47.00	47.50	47.50	....
Pittsburgh District				
NevilleIsland,Pa. P6	46.00	46.50	46.50	47.00
Pitts. N&S sides, Ambridge, Aliquippa, del.	47.19	47.69	47.69	48.19
McKeesRocks,del.	46.95	47.45	47.45	47.95
Lawrenceville, Homestead, McKeesport, Monaca, del.	47.44	47.94	47.94	48.44
Verona,del.	47.90	48.40	48.40	48.90
Brackenridge,del.	48.13	48.63	48.63	49.13
Bessemer,Pa. C3	46.00	....	46.50	47.00
Clairton,Rankin,So.Duquesne,Pa. C3	46.00	....	....	....
McKeesport,Pa. N3	46.00	....	....	47.00
Sharpsville,Pa. S6	46.00	46.50	46.50	47.00
Steelton,Pa. B2	48.00	48.50	49.00	49.50
Steubenville,O. W10	46.00	....	....	....
Struthers,O. S16	46.00	....	....	....
Swedeland,Pa. A3	48.00	48.50	49.00	49.50
Philadelphia,del.	49.44	49.94	50.44	50.94
Toledo,O. I3	46.00	46.50	46.50	47.00
Cincinnati,del.	51.01	51.51	....	....
Troy,N.Y. R2	48.00	48.50	49.00	....
Youngstown District				
Hubbard,O. Y1	46.00	46.50	46.50	....
Youngstown C3	46.00	....	....	47.00
Youngstown Y1	46.00	46.50	46.50	47.00
Mansfield,O.,del.	50.26	50.76	50.76	51.26

* Low phos, Southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%.

Phosphorous: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; Add $1 for each 0.5% Si to 11.50%)

Jackson,O. J1, G2	$59.50
Buffalo H1	60.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for 0.045% max. P)

NiagaraFalls,N.Y. P15	$71.50
Keokuk, Iowa, Openhearth & Fdry, frt. allowed K2	77.00
Keokuk, Iowa, OH & Fdry, 12½ lb, piglets, frt. allowed K2	82.00
Wenatchee, Wash. OH & Fdry, frt. allowed K2	77.00

CHARCOAL PIG IRON, Gross Ton

(Low phos, semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles,Tenn. T3	$66.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$51.00
Steelton,Pa. B2	54.00
Philadelphia delivered	56.9786
Troy,N.Y. R2	54.00

Semifinished and Finished Steel Products

Closing prices Sept. 15, 1949; cents per lb. unless otherwise noted. Code numbers following mill points indicate producing company, key on next page.

INGOTS, Carbon, Forging (NT)
Detroit R7 .....$50.00
Munhall,Pa. C3 ..... 50.00
INGOTS, Alloy (NT)
Detroit R7 .....$51.00
Houston,Tex. S5 ..... 59.00
Midland,Pa. C18 .... 51.00
Munhall,Pa. C3 ..... 51.00
So.Duquesne,Pa. C3 .. 51.00
BILLETS, BLOOMS & SLABS, Carbon, Rerolling (NT)
Bessemer,Pa. C3 .....$52.00
Clairton,Pa. C3 ..... 52.00
Conshohocken,Pa. A3 . 57.00
Ensley,Ala. T2 ..... 52.00
Fairfield,Ala. T2 ..... 52.00
Fontana,Calif. K1 ... 71.00
Gary,Ind. C3 ..... 52.00
Johnstown,Pa. B2 ... 52.00
Lackawanna,N.Y. B2 . 52.00
Munhall,Pa. C3 ..... 52.00
So.Chicago,Ill. C3 ... 52.00
So.Duquesne,Pa. C3 .. 52.00
BILLETS, BLOOMS & SLABS, Carbon, Forging (NT)
Bessemer,Pa. C3 .....$61.00
Buffalo R2 ..... 61.00
Canton,O. R2 ..... 61.00
Clairton,Pa. C3 ..... 61.00
Cleveland R2 ..... 61.00
Conshohocken,Pa. A3 . 63.00
Detroit R7 ..... 61.00
Ensley,Ala. T2 ..... 61.00
Fairfield,Ala. T2 ..... 61.00
Fontana,Calif. K1 ... 80.00
Gary,Ind. C3 ..... 61.00
Geneva,Utah G1 ..... 61.00
Houston,Tex. S5 ..... 69.00
Ind.Harbor,Ind. I2 .. 61.00
Johnstown,Pa. B2 ... 61.00
Lackawanna B2 ..... 61.00
Munhall,Pa. C3 ..... 61.00
So.Duquesne,Pa. C3 .. 61.00
So.Chicago,Ill. C3, R2 61.00
Warren,O. C17 ..... 61.00
BILLETS, BLOOMS & SLABS, Alloy (NT)
Bethlehem,Pa. B2 ...$63.00
Buffalo R2 ..... 63.00
Canton,O. R2, T7 .... 63.00
Conshohocken,Pa. A3 . 65.00
Detroit R7 ..... 63.00
Fontana,Calif. K1 ... 82.00
Gary,Ind. C3 ..... 63.00
Houston,Tex. S5 ..... 71.00
Johnstown,Pa. B2 ... 63.00
Lackawanna,N.Y. B2 . 63.00
Massillon,O. R2 .... 63.00
Midland,Pa. C18 .... 63.00
Munhall,Pa. C3 ..... 63.00
So.Chicago,Ill. C3, R2 63.00
So.Duquesne,Pa. C3 . 63.00
SHEET BARS (GT)
Mansfield,O. E6 .....$60.00
ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 .....$76.00
Cleveland R2 ..... 76.00
Ind.Harbor,Ind. I2 .. 76.00
Massillon,O. R2 ..... 76.00
So.Chicago,Ill. R2 ... 76.00
SKELP
Aliquippa,Pa. J5 ..... 3.25
Munhall,Pa. C3 ..... 3.25
Warren,O. R2 ..... 3.25
Youngstown C3, R2 .. 3.25
WIRE RODS
AlabamaCity,Ala. R2 ..3.40
Cleveland A7 .....3.40
Donora,Pa. A7 .....3.40
Fairfield,Ala. T2 .....3.40
Houston,Tex. S5 .....3.95
Ind.Harbor,Ind. Y1 ....3.40
Johnstown,Pa. B2 .....3.40
Joliet,Ill. A7 .....3.40
LosAngeles B3 .....4.20
Monessen,Pa. P7 .....3.40
Pittsburg,Calif. C11 ...4.05
Portsmouth,O. P12 .....3.40
So.Chicago,Ill. R2 .....3.40
SparrowsPoint B2 .....3.50
Sterling,Ill.(1) N15 ....3.40
Struthers,O. Y1 .....3.40
Torrance,Calif. C11 ....4.20
Worcester,Mass. A7 ....3.70
STRUCTURALS, Wide Flange
Bethlehem,Pa. B2 .....3.30
Lackawanna,N.Y. B2 ...3.30
Munhall,Pa. C3 .....3.20
So.Chicago,Ill. C3 .....3.20
STRUCTURALS, H.-S. Low-Alloy
Aliquippa,Pa. J5 .....4.95
Bessemer,Ala. T2 .....4.95
Bethlehem,Pa.(14) B2 .5.05
Clairton,Pa. C3 .....4.95
Fairfield,Ala. T2 .....4.95
Fontana,Calif. K1 .....6.10
Gary,Ind. C3 .....4.95
Ind.Harbor,Ind. I2, Y1 ..4.95
Johnstown,Pa. B2 .....5.05
Lackawanna B2 .....5.05
Munhall,Pa.(14) C3 ....4.95
So.Chicago,Ill.(14) C3 ..4.95
Struthers,O. Y1 .....4.95

STRUCTURALS, Carbon Steel Standard Shapes
Aliquippa,Pa. J5 .....3.25
Bessemer,Ala. T2 .....3.25
Bethlehem,Pa. B2 .....3.30
Clairton,Pa. C3 .....3.25
Fairfield,Ala. T2 .....3.25
Fontana,Calif. K1 .....3.80
Gary,Ind. C3 .....3.25
Geneva,Utah G1 .....3.25
Houston,Tex. S5 .....3.65
Ind.Harbor,Ind. I2 .....3.25
Johnstown,Pa. B2 .....3.30
KansasCity,Mo. S5 ....3.85
Lackawanna B2 .....3.30
LosAngeles B3 .....3.85
Minnequa,Colo. C10 ....3.75
Munhall,Pa. C3 .....3.25
Niles,Calif.(22) P1 ....3.97
Seattle B3 .....3.90
So.Chicago,Ill. C3, W14 .3.25
So.SanFrancisco B3 ....3.80
Torrance,Calif. C11 ....3.85
Weirton,W.Va. W6 .....3.25
STRUCTURALS, Alloy Standard Shapes
Clairton,Pa. C3 .....4.05
Fontana,Calif. K1 .....5.25
Munhall,Pa. C3 .....4.05
So.Chicago,Ill. C3 .....4.05
SHEET STEEL PILING
Ind.Harbor,Ind. I2 .....4.05
Lackawanna B2 .....4.05
Munhall,Pa. C3 .....4.05
So.Chicago,Ill. C3 .....4.05
Weirton,W.Va. W6 .....4.05
PLATES, Carbon Steel
AlabamaCity,Ala. R2 ...3.40
Aliquippa,Pa. J5 .....3.40
Ashland,Ky.(15) A10 ...3.40
Bessemer,Ala. T2 .....3.40
Clairton,Pa. C3 .....3.40
Claymont,Del. W16 ....3.50
Cleveland J5, R2 .....3.40
Coatesville,Pa. L7 .....3.50
Conshohocken,Pa. A3 ...3.50
Ecorse,Mich. G5 .....3.65
Fairfield,Ala. T2 .....3.40
Fontana,Calif. K1 .....4.00
Gary,Ind. C3 .....3.40
Geneva,Utah G1 .....3.40
Harrisburg,Pa. C5 .....3.50
Houston,Tex. S5 .....3.80
Ind.Harbor,Ind. I2, Y1 ..3.40
Johnstown,Pa. B2 .....3.40
Lackawanna B2 .....3.40
Minnequa,Colo. C10 ....4.30
Munhall,Pa. C3 .....3.40
Pittsburgh J5 .....3.40
Seattle B3 .....4.30
Sharon,Pa. S3 .....3.40
So.Chicago,Ill. C3, W14 .3.40
SparrowsPoint,Md. B2 ..3.40
Warren,O. R2 .....3.40
Weirton,W.Va. W6 .....3.40
Youngstown C3, Y1 ....3.40
PLATES (Universal Mill)
Fontana,Calif. K1 .....4.30
PLATES, Open-Hearth Alloy
Coatesville,Pa. L7 .....4.50
Conshohocken,Pa. A3 ..4.40
Fontana,Calif. K1 .....5.40
Gary,Ind. C3 .....4.40
Johnstown,Pa. B2 .....4.40
Munhall,Pa. C3 .....4.40
So.Chicago,Ill. C3 .....4.40
SparrowsPoint,Md. B2 ..4.40
PLATES, High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.20
Bessemer,Ala. T2 .....5.20
Clairton,Pa. C3 .....5.20
Cleveland J5, R2 .....5.20
Conshohocken,Pa. A3 ...5.20
Ecorse,Mich. G5 .....5.45
Fairfield,Ala. T2 .....5.20
Fontana,Calif. K1 .....5.80
Gary,Ind. C3 .....5.20
Geneva,Utah G1 .....5.20
Houston,Tex. S5 .....5.60
Ind.Harbor,Ind. I2, Y1 ..5.20
Johnstown,Pa. B2 .. ...5.20
Munhall,Pa. C3 .....5.20
Pittsburgh J5 .....5.20
Sharon,Pa. S3 .....5.65
So.Chicago,Ill. C3 .....5.20
SparrowsPoint,Md. B2 ..5.20
Warren,O. R2 .....5.20
Youngstown Y1 .....5.20
PLATES, Ingot Iron
Ashland,cl(15) A10 ....3.65
Ashland,lcl(15) A10 ....4.15
Cleve.Carlot R2 .....3.65
Warren,Carlot R2 .....3.65
PLATES, Wrought Iron
Economy,Pa. B14 .....7.85
FLOOR PLATES
Cleveland J5 .....4.55
Conshohocken,Pa. A3 ...4.55
Harrisburg,Pa. C5 .....4.55
Ind.Harbor,Ind. I2 .....4.55
Munhall,Pa. C3 .....4.55
So.Chicago,Ill. C3 .....4.55

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ...3.35
Aliquippa,Pa. J5 .....3.35
Alton,Ill.(1) L1 .....3.35
Ashland,Ky. A10 .....3.35
Atlanta,Ga. A11 .....3.50
Bessemer,Ala. T2 .....3.35
Buffalo R2 .....3.35
Canton,O. R2 .....3.35
Clairton,Pa. C3 .....3.35
Cleveland R2 .....3.35
Ecorse,Mich. G5 .....3.55
Emeryville,Calif. J7 ....4.10
Fairfield,Ala. T2 .....3.35
Fontana,Calif. K1 .....4.00
Gary,Ind. C3 .....3.35
Houston,Tex. S5 .....3.75
Ind.Harbor,Ind. I2, Y1..3.35
Johnstown,Pa. B2 .....3.35
KansasCity,Mo. S5 .....3.95
Lackawanna,N.Y. B2 ...3.35
LosAngeles B3 .....4.05
Midland,Pa. C18 .....3.35
Milton,Pa. B6 .....3.35
Minnequa,Colo. C10 ....3.85
Niles,Calif. P1 .....4.05
N.Tonawanda,N.Y. B11.3.35
Pittsburg,Calif. C11 ....4.05
Pittsburgh J5 .....3.35
Portland,Oreg. O4 .....4.10
Seattle B3, N14 .....4.10
S.Chicago C3, R2, W14..3.35
So.Duquesne,Pa. C3 ....3.35
S.SanFran.,Cal. B3 ....4.10
Struthers,O. Y1 .....3.35
Torrance,Calif. C11 ....4.05
Weirton,W.Va. W6 .....3.35
Youngstown C3, R2 ....3.35
BARS, Cold-Finished Carbon
Aliquippa,Pa. K5 .....4.00
Ambridge,Pa. W18 .....4.00
BeaverFalls,Pa. M12, R2...4.00
Buffalo B5 .....4.00
Camden,N.J. P13 .....4.48
Carnegie,Pa. C12 .....4.00
Chicago W18 .....4.00
Cleveland A7, C20 .....4.00
Cumberland,Md. C19 ...3.95
Donora,Pa. A7 .....4.00
Ecorse,Mich. G5 .....4.30
Elyria,O. W8 .....4.00
FranklinPark,Ill. N5 ...4.00
Gary,Ind. R2 .....4.00
Hammond,Ind. L2, M13..4.00
Hartford,Conn. R2 ....4.40
Harvey,Ill. B5 .....4.00
Indianapolis M13 .....4.20
LosAngeles R2 .....5.40
Mansfield,Mass. B5 ....4.40
Massillon,O. R2 .....4.00
Midland,Pa. C18 .....4.00
Monaca,Pa. S17 .....4.00
Newark,N.J. W18 .....4.40
NewCastle,Pa. B4 .....4.00
Plymouth,Mich. P5 ....4.25
Pittsburgh J5 .....3.95
Putnam,Conn. W18 .....4.40
Readville,Mass. C14 ....4.40
St.Louis,Mo. M5 .....4.35
So.Chicago,Ill. W14 ....4.00
SpringCity,Pa.(5) K3 ..4.48
Struthers,O. Y1 .....4.00
Waukegan,Ill. A7 .....4.00
Youngstown F3, Y1 ....4.00
BAR SIZE ANGLES; S. SHAPES
Atlanta,Ga. A11 .....3.50
Bethlehem,Pa.(2) B2 ..3.55
Johnstown,Pa. B2 .....3.35
Lackawanna,N.Y. B2 ...3.35
Niles,Calif. P1 .....4.05
Portland,Oreg. O4 .....3.90
SanFrancisco S7 .....4.05
Weirton,W.Va. W6 .....3.35
BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. C3 .....4.00
Fontana,Calif. K1 .....4.75
Gary,Ind. C3 .....4.00
Youngstown C3 .....4.00
BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 .. ....5.10
Bessemer,Ala. T2 .....5.10
Bethlehem,Pa. B2 .....5.10
Clairton,Pa. C3 .....5.10
Cleveland R2 .....5.10
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.10
Fontana,Calif. K1 .....6.15
Gary,Ind. C3 .....5.10
Ind.Harbor,Ind. I2, Y1..5.10
Johnstown,Pa. B2 .....5.10
Lackawanna B2 .....5.10
Pittsburgh J5 .....5.10
So.Duquesne,Pa. C3 ....5.10
Struthers,O. Y1 .....5.10
Youngstown C3 .....5.10
BARS, Wrought Iron
Economy,Pa.(S.R.) B14 9.50
Economy,Pa.(D.R.) B14 11.00
Economy(Stablt) B14 . 11.30
McK.Rks.(S.R.) L5 .. 8.60
McK.Rks.(D.R.) L5 .. 11.25
McK.Rks.(Staybolt) L5 12.75

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 .....3.75
Buffalo R2 .....3.75
Canton,O. R2, T7 .....3.75
Clairton,Pa. C3 .....3.75
Ecorse,Mich. G5 .....4.05
Fontana,Calif. K1 .....4.75
Gary,Ind. C3 .....3.75
Houston,Tex. S5 .....4.15
Ind.Harbor,Ind. I2, Y1..3.75
Johnstown,Pa. B2 .....3.75
KansasCity,Mo. S5 .....4.35
Lackawanna,N.Y. B2 ...3.75
LosAngeles B3 .....4.80
Massillon,O. R2 .....3.75
Midland,Pa. C18 .....3.75
S.Chicago C3, R2, W14..3.75
So.Duquesne,Pa. C3 ...3.75
Struthers,O. Y1 .....3.75
Warren,O. C17 .....3.75
Youngstown C3 .....3.75
BARS, Cold-Finished Alloy
Aliquippa,Pa. K5 .....4.65
Ambridge,Pa. W18 .....4.65
BeaverFalls,Pa. M12 ....4.65
Bethlehem,Pa. B2 .....4.65
Buffalo B5 .....4.65
Canton,O. R2, T7 .....4.65
Carnegie,Pa. C12 .....4.65
Chicago W18 .....4.65
Cleveland A7, C20 .....4.65
Donora,Pa. A7 .....4.65
Elyria,O. W8 .....4.65
Gary,Ind. R2 .....4.65
Hammond,Ind. L2, M13.4.65
Hartford,Conn. R2 .....4.95
Harvey,Ill. B5 .....4.65
Indianapolis M13 .....4.85
Lackawanna,N.Y. B2 ..4.65
Mansfield,Mass. B5 ....4.95
Massillon,O. R2 .....4.65
Midland,Pa. C18 .....4.65
Monaca,Pa. S17 .....4.65
Newark,N.J. W18 .....4.95
So.Chicago,Ill. R2, W14.4.65
Struthers,O. Y1 .....4.65
Waukegan,Ill. A7 .....4.65
Worcester,Mass. A7 ....4.95
Youngstown F3, Y1 ....4.65
BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ...3.35
Alton,Ill.(6) L1 .....3.35
Atlanta,Ga.(7) A11 ....3.50
Buffalo R2 .....3.35
Cleveland R2 .....3.35
Emeryville,Calif. J7 ....4.10
Fairfield,Ala. T2 .....3.35
Fontana,Calif. K1 .....4.00
Ft.Worth,Tex. T4 .....4.33
Gary,Ind. C3 .....3.35
Houston,Tex. S5 .....3.75
Ind.Harbor,Ind. I2, Y1..3.35
Johnstown,Pa. B2 .....3.35
KansasCity,Mo. S5 .....3.95
Lackawanna B2 .....3.35
LosAngeles B3 .....4.05
Minnequa,Colo. C10 ....4.25
Niles,Calif. P1 .....4.05
Pittsburg,Calif. C11 ....4.05
Pittsburgh J5 .....3.35
Portland,Oreg O4 .....4.10
Seattle,Wash. B3, N14..4.10
So.Chicago,Ill. R2 .....3.35
So.Duquesne,Pa. C3 ....3.35
So.SanFrancisco B3 ....4.10
SparrowsPoint,Md. B2 ..3.35
Struthers,O. Y1 .....3.35
Torrance,Calif. C11 ....4.05
Youngstown C3, R2 ....3.35
BARS, Reinforcing (Fabricated; to Consumers)
Ft.Worth,Tex. T4 .....4.83
Johnstown,¼-1" B2 ....4.25
LosAngeles B3 .....5.00
Pittsburgh J5 .....4.25
Seattle B3, N14 .....5.00
So.SanFrancisco B3 ....5.00
SparrowsPt.,1⅛-1¼" B2..4.83
SparrowsPt.,¼-1" B2 ..4.25
RAIL STEEL BARS
ChicagoHts.,Ill.(3) J2 ..3.25
Hntngtn.W.Va.(3,4) W7..3.35
Moline,Ill.(3) R2 .....3.35
Williamsport(2,3) S19 ..3.35
Williamsport(4) S19 ....3.85
BARS, Hot-Rolled Ingot Iron
Ashland,Ky. A10 .... 3.60
SHEETS, Cold-Rolled, High-Strength Low-Alloy
Cleveland J5, R2 .....6.05
Ecorse,Mich. G5 .....6.25
Fontana,Calif. K1 .....6.95
Gary,Ind. C3 .....6.05
Ind.Harbor,Ind. I2, Y1 ..6.05
Irvin,Pa. C3 .....6.05
Lackawanna B2 .....6.05
Pittsburgh J5 .....6.05
SparrowsPoint,Md. B2 ..6.05
Warren,O. R2 .....6.05
Weirton,W.Va. W6 ....6.05
Youngstown Y1 .....6.05

SHEETS, Hot-Rolled Steel (18 gage and heavier)
AlabamaCity,Ala. R2 ..3.25
Ashland,Ky.(8) A10 ...3.25
Butler,Pa. A10 .....3.25
Cleveland J5, R2 .....3.25
Conshohocken,Pa. A3 ..3.35
Ecorse,Mich.(8) G5 ....3.45
Fairfield,Ala. T2 .....3.25
Fontana,Calif. K1 .....4.15
Gary,Ind. C3 .....3.25
Ind.Harbor,Ind. I2, Y1 ..3.25
Irvin,Pa. C3 .....3.25
KansasCity,Mo. S5 .....6.25
Kokomo,Ind. C16 .....3.35
Lackawanna B2 .....3.25
Munhall,Pa. C3 .....3.25
Pittsburg,Calif. C11 ...3.95
Pittsburgh J5 .....3.25
Sharon,Pa. S3 .....3.25
So.Chicago,Ill. W14 ....3.25
SparrowsPoint,Md. B2 ..3.25
Steubenville,O. W10 ....3.25
Torrance,Calif. C11 ....3.95
Warren,O. R2 .....3.25
Weirton,W.Va. W6 .....3.25
Youngstown C3, Y1 ....3.25
SHEETS, Hot-Rolled Carbon Steel (19 gage and lighter)
AlabamaCity,Ala. R2 ..4.40
Dover,O. R1 .....5.00
Fairfield,Ala. T2 .....4.15
Ind.Harbor,Ind. I2 .....4.15
Kokomo,Ind. C16 .....4.25
Mansfield,O. E5 .....4.15
Niles,O. N12, M4 .....4.15
Torrance,Calif. C11 ....5.05
SHEETS, Cold-Rolled Steel (Commercial Quality)
Butler,Pa. A10 .....4.00
Cleveland J5, R2 .....4.00
Ecorse,Mich. G5 .....4.20
Fairfield,Ala. T2 .....4.00
Follansbee,W.Va. F4 ....4.00
Fontana,Calif. K1 .....4.90
Gary,Ind. C3 .....4.00
GraniteCity,Ill. G4 ....4.20
Ind.Harbor,Ind. I2, Y1 ..4.00
Irvin,Pa. C3 .....4.00
Lackawanna B2 .....4.00
Middletown,O. A10 .....4.00
Pittsburg,Calif. C11 ....4.95
Pittsburgh J5 .....4.00
SparrowsPoint,Md. B2 ..4.00
Steubenville,O. W10 ....4.00
Warren,O. R2 .....4.00
Weirton,W.Va. W6 .....4.00
Youngstown Y1 .....4.00
SHEETS, Hot-Rolled, High-Strength Low-Alloy (14 Gage & Heavier)
Cleveland J5, R2 .....4.95
Conshohocken,Pa. A3 ...4.95
Ecorse,Mich. G5 .....5.15
Fairfield,Ala. T2 .....4.95
Fontana,Calif. K1 .....6.64
Gary,Ind. C3 .....4.95
Ind.Harbor,Ind. I2, Y1 ..4.95
Irvin,Pa. C3 .....4.95
Lackawanna B2 .....4.95
Pittsburgh J5 .....4.95
So.Chicago,Ill. C3 .....4.95
SparrowsPoint,Md. B2 ..4.95
Warren,O. R2 .....4.95
Weirton,W.Va. W6 .....4.95
Youngstown C3, Y1.....4.95
SHEETS, Gal'zd No. 10 Steel
AlabamaCity,Ala. R2 ...4.40
Ashland,Ky.(8) A10 ...4.40
Canton,O. R2 .....4.40
Dover,O. R1 .....5.40
Fairfield,Ala. T2 .....4.40
Gary,Ind. C3 .....4.40
GraniteCity,Ill. G4 ....4.60
Ind.Harbor,Ind. I2 .....4.40
Irvin,Pa. C3 .....4.40
Kokomo,Ind. C16 .....4.50
MartinsFerry,O. W10 ...4.40
Niles,O. N12 .....4.40
Pittsburg,Calif. C11 ....5.15
SparrowsPoint,Md. B2 ..4.40
Steubenville,O. W10 ....4.40
Torrance,Calif. C11 ....5.15
Weirton,W.Va. W6 .....4.40
SHEETS, Galvanized No. 10, High-Strength Low-Alloy
Irvin,Pa. C3 .....6.75
SparrowsPoint,Md. B2 ..6.75
SHEETS, Galvannealed Steel
Canton,O. R2 .....4.95
Irvin,Pa. C3 .....4.95
Kokomo,Ind. C16 .....5.05
Niles,O. N12 .....4.95
SHEETS, Zincgrip No. 10
Butler,Pa. A10 .....4.65
Middletown,O. A10 .....4.65
SHEETS, Electro Galvanized
Weirton,W.Va. W6 .....5.00
SHEETS, Zinc Alloy
Ind.Harbor,Ind. I2 .....5.05
SHEETS, Aluminized
Butler,Pa. A10 .....7.75

SHEETS, Culvert, No. 16 Flat

	Cu Alloy	Cu FE
Ashland A10	5.00	...
Fairfield,Ala. T2	...	5.00
Gary C3	5.00	5.35
GraniteCity G4	5.40	5.70
Irvin C3	5.00	5.35
Kokomo C16	5.40	...
Pittsburg,Cal. C11	5.75	...
SparrowsPt. B2	5.00	...
Torrance,Cal. C11	5.75	...

SHEETS, Culvert, No. 16 Flat Ingot Iron

Ashland,Ky. A10	5.25

SHEETS, Well Casing

Torrance,Calif. C11	4.75
Youngstown C3	3.75

SHEETS, Mfg. Ternes, E lb

Yorkville,O. W.10	$8.10

SHEETS, Long Terne, Steel (No. 10; Commercial Quality)

BeechBotm.,W.Va. W10	4.80
Gary,Ind. C3	4.80
Mansfield,O. E5	4.80
Middletown,O. A10	4.80
Weirton,W.Va. W6	4.80

ROOFING SHORT TERNES (Package; 8 lb coated)

Gary,Ind. C3	$17.50
Yorkville,O. W10	17.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$6.75
Gary,Ind. C3	6.65
Ind.Harbor,Ind. I2	6.65
Irvin,Pa. C3	6.65
Weirton,W.Va. W6	6.65
Yorkville,O. W10	6.65

SHEETS, Lt. Coated Ternes, 6 lb

Yorkville,O. W10	$7.20

SHEETS, Coated Ternes, 8 lb

Gary,Ind. C3	8.10

SHEETS, Coated Ternes, 12 lb

Yorkville,O. W10	8.95

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.20

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.50
Cleveland R2	3.85
Ind.Harbor,Ind. I2	3.50
Warren,O. R2	3.85

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.60
Middletown,O. A10	4.50
Warren,O. R2	4.60

SHEETS, Galvanized Ingot Iron No. 10 Flat

Ashland,Ky.(8) A10	4.65
Canton,O. R2	5.15
Ind.Harbor,Ind. I2	4.95

SHEETS, Zincgrip No. 10 Flat, Ingot Iron

Butler,Pa. A10	4.90
Middletown,O. A10	4.90

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.10
Carnegie,Pa. S18	5.10
Fontana,Calif. K1	6.30
Gary,Ind. C3	5.10
Houston,Tex. S5	5.50
KansasCity,Mo. S5	5.70
NewBritn,Conn.(10) S15	5.10
Sharon,Pa. S3	5.10
Youngstown C3	5.10

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10) S15	9.50
Carnegie,Pa. S18	9.50
Cleveland A7	9.50
Harrison,N.J. C18	9.80
NewBritn,Conn.(10) S15	9.50
Pawtucket,R.I.(11) N8	9.50
Pawtucket,R.I.(12) N8	9.80
Sharon,Pa. S3	9.50
Worcester,Mass. A7	9.80

HOLLOWARE ENAMELING Black Plate (29 gage)

Aliquippa,Pa. J5	5.30
Follansbee,W.Va. F4	5.30
Gary,Ind. C3	5.30
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. C3	5.30
Niles,O. R2	5.30
Warren,O. R2	5.30
Yorkville,O. W10	5.30

SHEETS, Enam'lg. Iron, No. 12

Ashland,Ky.(8) A10	4.40
Cleveland R2	4.40
Ecorse,Mich. G5	4.70
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I2	4.40
Irvin,Pa. C3	4.40
Middletown,O. A10	4.40
Niles,O. M4	4.40
Youngstown Y1	4.40

CANMAKING BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$5.75
Fairfield,Ala. T2	5.85
Gary,Ind. C3	5.75
GraniteCity,Ill. G4	5.95
Ind.Harbor,Ind. I2, Y1	5.75
Irvin,Pa. C3	5.75
Niles,O. R2	5.75
Pittsburg,Calif. C11	6.50
SparrowsPoint,Md. B2	5.85
Warren,O. R2	5.75
Weirton,W.Va. W6	5.75
Yorkville,O. W10	5.75

TIN PLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa J5	$7.50	$7.75
Fairfield,Ala. T2	7.60	7.85
Gary C3	7.50	7.75
Gran.City.,Ill G4	7.70	7.95
Ind.Harb. I2, Y1	7.50	7.75
Irvin,Pa. C3	7.50	7.75
Pitts.,Cal. C11	8.25	8.50
Sp.Pt.,Md. B2	7.60	7.85
Warren R2	7.50	7.75
Weirton W6	7.50	7.75
Yorkville,O. W10.	7.50	7.75

TIN PLATE, Electrolytic (Base Box)

	0.25 lb.	0.50 lb.	0.75 lb.
Aliquippa,Pa. J5	$6.45	$6.70	$7.00
Fairfield,Ala. T2	6.55	6.80	7.10
Gary,Ill. C3	6.45	6.70	7.00
GraniteCity,Ill. G4	6.65	6.90	7.20
Ind.Harbor,Ind. I2, Y1	6.45	6.70	7.00
Irvin,Pa. C3	6.45	6.70	7.00
Niles,O. R2	6.45	6.70	7.00
Pittsburg,Calif. C11	7.20	7.45	7.75
SparrowsPoint,Md. B2	6.55	6.80	7.10
Weirton,W.Va. W6	6.45	6.70	7.00
Yorkville,O. W10	6.45	6.70	7.00

SHEETS SILICON, (24 Gage Base)

	Field	Arm.	Elec.	Motor	Dyn.
BeechBottom,W.Va. W10	...	5.45	5.95	6.70	7.50
Brackenridge,Pa. A4	...	...	5.95	6.70	7.50
Follansbee,W.Va. F4	...	5.45	5.95	6.70	7.50
GraniteCity,Ill. G4	...	...	6.15	6.90	7.70
Ind.Harbor,Ind. I2	5.15	5.45	5.95	...	...
Mansfield,O. E5	5.15	5.45	5.95	...	...
Niles,O. M4	5.15	5.45	5.95	...	...
Niles,O. N12	...	5.45	5.95	...	...
Toronto,O. F4	...	5.45	5.95	6.70	7.50
Vandergrift,Pa. C3	...	5.45	5.95	6.70	7.50
Warren,O. R2	...	5.45	5.95	6.70	...
Zanesville,O. A10	...	5.45	5.95	6.70	7.50

COILS AND CUT LENGTHS, Cold-Rolled, Silicon

	Field	Arm.	Elec.	Motor	Dyn.
Vandergrift,Pa. C3	...	5.70	6.20	6.95	7.75
Warren,O. R2	5.40	5.70	6.20	6.95	7.75

SHEETS, Silicon Transformer Grade

	72	65	58	52
BeechBottom,W.Va. W10	8.05	8.60	9.30	10.10
Brackenridge,Pa. A4	8.05	8.60	9.30	....
Follansbee,W.Va. F4	8.05	8.60	9.30	10.10
Toronto,O. F4	8.05	8.60	9.30	10.10
Vandergrift,Pa. C3	8.05	8.60	9.30	10.10
Zanesville,O. A10	8.05	8.60	9.30	10.10

COLD-REDUCED COILS and Cut Lengths, Silicon

	72	T-100	T-90	T-80
Butler,Pa. A10	...	12.35	13.60	14.85
Vandergrift,Pa. C3	8.30	11.35	12.60	13.85
Warren,O. R2	8.30	....	....	....

STRIP, Hot-Rolled Carbon

Alton,Ill.(1) L1	3.25
Ashland,Ky. A10	3.25
Atlanta A11	3.40
Bessemer,Ala. T2	3.25
Bridgeprt,Conn.(10) S15	3.25
Butler,Pa. A10	3.25
Carnegie,Pa. S18	3.25
Cleveland J5	3.25
Detroit M1	3.45
Ecorse,Mich. G5	3.45
Fairfield,Ala. T2	3.25
Fontana,Calif. K1	4.40
Gary,Ind. C3	3.25
Houston,Tex. S5	3.65
Ind.Harbor,Ind. I2, Y1	3.25
KansasCity,Mo.(9) S5	3.85
Lackawanna B2	3.25
LosAngeles B3	4.00
Milton,Pa. B6	3.25
Minnequa,Colo. C10	4.30
NewBritain(10) S15	3.25
N.Tonawanda,N.Y. B11	3.30
Pittsburg,Calif. C11	4.00
Pittsburgh J5	3.25
RiverdaleSta.,Ill. A1	3.25
SanFrancisco S7	4.00
Seattle B3, N14	4.25
Sharon,Pa. S3	3.25
So.Chicago,Ill. W14	3.25
So.SanFrancisco B3	4.00
SparrowsPoint,Md. B2	3.25
Torrance,Calif. C11	4.00
Warren,O. R2	3.25
Weirton,W.Va. W6	3.25
WestLeechburg,Pa. A4	3.25
Youngstown C3, Y1	3.25

STRIP, Cold-Rolled Carbon

Berea,O. C7	6.10
Bridgeprt,Conn.(10) S15	4.00
Butler,Pa. A10	4.00
Chicago,Ill. T6	4.15
Cleveland A7, J5	4.00
Detroit D2, D3	4.25
Detroit M1	4.20
Dover,O. G6	4.00
Ecorse,Mich. G5	4.20
Follansbee,W.Va. F4	4.00
Fontana,Calif. K1	4.90
Ind.Harbor,Ind. I2	4.00
Lackawanna B2	4.00
LosAngeles C1	5.00
Middletown,O. A10	4.00
NewBritain(10) S15	4.00
NewCastle,Pa. E5	4.00
NewHaven,Conn. A7, D2	4.50
NewKensington,Pa. A6	4.00
NewYork W3	5.00
Pawtucket,R.I.(11) N8	4.55
Pawtucket,R.I.(21) N8	4.50
Pawtucket,R.I. R3	4.50
Pittsburgh J5	4.00
RiverdaleSta.,Ill. A1	4.15
Sharon,Pa. S3	4.00
SparrowsPoint,Md. B2	4.00
Trenton,N.J.(13) R5	4.50
Wallingford,Conn. W2	4.50
Warren,O. R2, T5	4.00
Weirton,W.Va. W6	4.00
Youngstown C8, Y1	4.00

STRIP, Cold-Rolled, High-strength Low-Alloy

Cleveland A7, J5	6.05
Ecorse,Mich. G5	6.25
Fontana,Calif. K1	6.95
Lackawanna B2	6.05
Pittsburgh J5	6.05
Sharon,Pa. S3	6.05
SparrowsPoint,Md. B2	6.05
Warren,O. R2	6.05
Weirton,W.Va. W6	6.05
Youngstown Y1	6.05

TIGHT COOPERAGE HOOP

Atlanta A11	3.60
RiverdaleSta.,Ill. A1	3.60
Sharon,Pa. S3	3.60
Youngstown C3	3.60

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky. A10	3.50
Warren,O. R2	3.85

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	4.60

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2	4.95
Cleveland J5	4.95
Ecorse,Mich. G5	5.15
Fairfield,Ala. T2	4.95
Fontana,Calif. K1	6.64
Gary,Ind. C3	4.95
Ind.Harbor,Ind. I2, Y1	4.95
Lackawanna B2	4.95
Pittsburgh J5	4.95
Sharon,Pa. S3	4.95
SparrowsPoint,Md. B2	4.95
Warren,O. R2	4.95
Weirton,W.Va. W6	4.95
Youngstown C3, Y1	4.95

WIRE, MB Spring, High-Carbon

Aliquippa,Pa J5	5.55
Alton,Ill.(1) L1	5.55
Buffalo W12	5.55
Cleveland A7	5.55
Donora,Pa. A7	5.55
Duluth A7	5.55
Johnstown,Pa. B2	5.55
LosAngeles B3	6.50
Monessen,Pa. P7	5.55
Palmer,Mass. W12	5.85
Pittsburg,Calif. C11	6.50
Portsmouth,O. P12	5.55
So.Chicago,Ill. R2	5.55
SparrowsPoint,Md. B2	5.65
Struthers,O. Y1	5.55
Trenton,N.J. A7, R5	5.85
Waukegan,Ill. A7	5.55
Worcester A7,J4,T6,W12	5.85

WIRE, Cold-Rolled Flat

Buffalo W12	5.30
Chicago T6	5.35
Cleveland A7	5.00
Kokomo,Ind. C16	5.00
Monessen,Pa. P7	5.00
Pawtucket,R.I.(11) N8	5.55
Pawtucket,R.I.(12) N8	5.50
Worcester,Mass. A7	5.30
Trenton,N.J. R5	5.30
Worcester,Mass. W12	5.75
Worcester,Mass. T6	5.30

WIRE, Fine and Weaving (8-in. Coils)

Chicago W13	7.70
Cleveland A7	7.70
Johnstown,Pa. B2	7.70
Kokomo,Ind. C16	7.70
Portsmouth,O. P12	7.70
Struthers,O. Y1	7.70
Trenton,N.J. R5	8.00
Waukegan,Ill. A7	7.70
Worcester,Mass. A7, T6	8.00

WIRE, Manufacturers Bright, Low-Carbon

AlabamaCity,Ala. R2	4.15
Aliquippa,Pa J5	4.15
Alton,Ill.(1) L1	4.15
Bartonville,Ill.(1) K4	4.15
Buffalo W12	4.15
Chicago W13	4.15
Cleveland A7, C20	4.15
Crawfrdsvll,Ind. M8	4.30
Donora,Pa. A7	4.15
Duluth A7	4.15
Fairfield,Ala. T2	4.15
Houston,Tex. S5	4.55
Johnstown,Pa. B2	4.15
Joliet,Ill. A7	4.15
KansasCity,Mo. S5	4.75
Kokomo,Ind. C16	4.25
LosAngeles B3	5.10
Minnequa,Colo. C10	4.50
Monessen, Pa. P7	4.15
Newark,6-8ga, I1	4.75
No.Tonawanda B11	4.18
Palmer,Mass. W12	4.45
Pittsburg,Calif. C11	5.10
Portsmouth,O. P12	4.15
Rankin,Pa. A7	4.15
So.Chicago,Ill. R2	4.15
So.SanFrancisco C10	5.10
SparrowsPoint,Md. B2	4.25
Sterling,Ill.(1) N15	4.15
Struthers,O. Y1	4.15
Torrance,Calif. C11	5.10
Waukegan,Ill. A7	4.15
Worcester,Mass. A7, T6	4.45

WIRE, Merchant Quality (6 to 8 gage)

	An'ld.	Galv.
Ala.Cty. K2	4.80	5.25
Aliquippa J5	4.80	5.25
Atlanta A11	4.95	5.40
Bartnville.(19) K4	4.80	5.25
Cleveland A7	4.80	5.25
Crawfrdsvll. M8	4.95	5.40
Donora A7	4.80	5.25
Duluth A7	4.80	5.25
Fairfield T2	4.80	5.25
Houston,Tex. S5	5.20	5.65
Johnstown B2	4.80	5.25
Joliet,Ill. A7	4.80	5.25
KansasCity,Mo. S5	5.40	5.85
Kokomo C16	4.90	5.35
LosAngeles B3	5.75	...
Minnequa C10	5.15	5.60
Monessen P7	4.80	5.25
Pitts.Cal. C11	5.75	6.20
Portsmth.(18) P12	4.80	5.25
Rankin A7	4.80	5.25
So.Chicago R2	4.80	5.25
So.S.Fran. C10	5.75	6.20
Sp.Pt. B2	4.90	5.35
Sterling,Ill.(1) N15	4.80	5.25
Struthers,O. Y1	4.80	5.25
Worcester A7	5.10	5.55

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.25-0.40C	0.40-0.60C	0.60-0.80C	0.80-1.05C	1.05-1.35C
Bridgeprt,Conn.(10) S15	4.00	5.50	6.10	8.05	10.35
Bristol,Conn. W1	...	...	6.40	8.35	....
Carnegie,Pa. S18	...	5.50	6.10	8.05	10.35
Chicago T6	4.25	5.05	6.25	8.20	10.50
Cleveland A7	4.00	5.50	6.10	8.05	10.35
Dover,O. G6	4.00	5.50	6.10	7.85	10.15
Harrison,N.J. C18	...	...	6.40	8.35	10.65
Mattapan,Mass. T6	4.50	5.80	6.40	8.35	10.65
NewCastle,Pa. B4	4.00	5.50	6.10	...	....
NewYork W3	...	5.80	6.40	8.35	10.65
Pawtucket,R.I. N8 Cleve.orPitts.Base	4.55	5.50	6.10	8.05	10.35
Worcester,Mass.Base	4.50	5.80	6.40	8.35	10.65
Trenton,N.J. R5	...	5.80	6.40	8.35	10.65
Union,N.J. H6	4.40	6.35	6.35	8.30	10.50
Wallingford,Conn. W2	4.50	5.80	6.40	8.35	10.65
Weirton,W.Va. W6	4.00	5.50	6.10	8.05	10.35
Worcester,Mass. A7	4.30	5.80	6.40	8.35	10.65
Worcester,Mass. T6	4.50	5.80	6.40	8.35	10.65
Youngstown C8	4.50	5.50	6.10	8.05	10.35

Key to Producing Companies

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A6 American Shim Steel Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Boiardi Steel Corp.
B8 Braeburn Alloy Steel Co.
B11 Buffalo Bolt Co.
B14 A. M. Byers Co.

C1 Calif. Cold-Rolled Steel
C3 Carnegie-Illinois Steel
C4 Carpenter Steel Co.
C5 Central Iron & Steel Co.
C7 Cleve. Cld. Roll. Mills Co.
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Col. Steel & Shafting Co.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Co.
D4 Disston & Sons, Henry

E1 Eastrn. Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Co.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F6 Fretz-Moon Tube Co.

G1 Geneva Steel Co.
G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H4 Heppenstall Co.
H6 Hind Steel Co. Inc

I1 Igoe Bros. Inc.
I2 Inland Steel Co.
I3 Interlake Iron Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J7 Judson Steel Corp.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K5 Kidd Drawn Steel Co.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.20
Alton,Ill.(1) L1	5.20
Cleveland A7	5.20
Donora,Pa. A7	5.20
Duluth A7	5.20
Johnstown,Pa. B2	5.20
LosAngeles B3	6.15
NewHaven,Conn. A7	5.50
Pittsburg,Calif. C11	6.15
Portsmouth,O. P12	5.20
So.Chicago,Ill. R2	5.20
SparrowsPoint,Md. B2	5.30
Struthers,O. Y1	5.20
Torrance,Calif. C11	6.15
Trenton,N.J. A7	5.50
Waukegan,Ill. A7	5.20
Worcester,Mass. A7	5.50

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	123
Aliquippa,Pa. J5	123
Atlanta A11	125
Bartonville,Ill.(19) K4	123
Crawfordsville MS	126
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Houston,Tex. S5	131
Johnstown,Pa. B2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	130
Monessen,Pa. P7	123
Pittsburg,Calif. C11	143
Portsmouth,O.(18) P12	123
Rankin,Pa. A7	123
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	143
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

WIRE (16 gage)

	An'ld. Stone	Galv. Stone
Cleve. A7	9.05	10.55
Johnstwn B2	9.05	10.55
Kokomo C16	9.05-10.10	
Minnequa C10	9.40	10.90
Pitts.Cal. C11	9.40	10.90
Prtsmth.(18) P12	9.05	10.55
Sp.Pt., B2	9.15	10.65
Struthers Y1	9.05	10.55
Waukegan A7	9.05	10.55

ROPE WIRE

	Mild Plow	Plow	Imp. Plow
Cleveland A7	7.50	7.80	8.20
Donora,Pa. A7	7.50	7.80	8.20
Johnstown,Pa. B2	7.50	7.80	8.20
Monessen,Pa. P7	7.50	7.80	8.20
NewHaven,Conn. A7	7.80	8.10	8.50
Portsmouth,O. P12	7.50	7.80	8.20
SparrowsPoint,Md. B2	7.60	7.90	8.30
Struthers,O. Y1	7.50	7.80	8.20
Trenton,N.J. A7	7.80	8.10	8.50
Trenton,N.J. R5	7.50	7.80	8.20
Waukegan,Ill. A7	7.50	7.80	8.20
Williamsport,Pa. B2	7.60	7.90	8.30
Worcester,Mass. J4	7.50	7.80	8.20

RAILS

	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb. Under
Bessemer,Pa. C3	3.20	3.10	3.15	3.55
Ensley,Ala. T2	3.20	3.10	3.15	3.55
Fairfield,Ala. T2	...	...	...	3.55
Gary,Ind. C3	3.20	3.10	3.15	...
Ind.Harbor,Ind. I2	3.20	3.10	3.15	...
Johnstown,Pa. B2	...	...	...(16)	3.55
Lackawanna B2	3.20	3.10	...	3.55
Minnequa,Colo. C10	3.20	3.10	...	4.25
Steelton,Pa. B2	3.20	3.10	...	...

WOVEN FENCE, 9-15½ gage

	Col.
Ala.City,Ala.,17-18ga.	R2.175
AlabamaCity,Ala.	R2....109
Alquip.,Pa.9-14½ga.	J5..109
Atlanta A11	111
Bartonville,Ill.(19)	K4 ..109
Crawfordsvil,Ind.	MS ...112
Donora,Pa. A7	109
Duluth A7	109
Houston,Tex. S5	117
Fairfield,Ala. T2	109
Johnstown,Pa. B2	109
Johnstn,17ga.,6"	B2 ...183
Johnstn,17ga.,4"	B2 ...186
Joliet,Ill. A7	109
KansasCity,Mo. S5	121
Kokomo,Ind. C16	111
Minnequa,Colo. C10	116
Monessen,Pa. D7	109
Pittsburg,Calif. C11	132
Portsmouth,O.(18) P12	109
Rankin,Pa. A7	109
So.Chicago,Ill. R2	109
Sterling,Ill.(1) N15	109

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	106
Atlanta A11	107
Chicago W13	106
Crawfordsville MS	109
Donora,Pa. A7	106
Duluth A7	106
Fairfield,Ala. T2	106
Joliet,Ill. A7	106
Kokomo,Ind. C16	108
Minnequa,Colo. C10	113
Pittsburg,Calif. C11	130
Portsmouth,O.(18) P12	106
So.Chicago,Ill. R2	106
So.SanFran.,Calif. C10	130
SparrowsPoint,Md. B2	108
Sterling,Ill.(1) N15	106

NAIL & STAPLES, Non-Stock

AlabamaCity,Ala. R2	5.20
Donora,Pa. A7	5.20
Duluth A7	5.20
Johnstown,Pa. B2	5.20
Joliet,Ill. A7	5.20
Kokomo,Ind. C16	5.30
Minnequa,Colo. C10	5.55
Pittsburg,Calif. C11	6.15
Rankin,Pa. A7	5.20
So.Chicago,Ill. R2	5.20
SparrowsPoint,Md. B2	5.30
Worcester,Mass. A7	5.50

NAILS & STAPLES, Stock (To Consumers)

	Col.
AlabamaCity,Ala. R2	103
Aliquippa,Pa. J5	103
Atlanta A11	105
Bartonville,Ill.(19) K4	103
Cleveland A9	110
Crawfordsville MS	106
Donora,Pa. A7	103
Duluth A7	103
Fairfield,Ala. T2	103
Houston,Tex. S5	111
Johnstown,Pa. B2	103
Joliet,Ill. A7	103
KansasCity,Mo. S5	115
Kokomo,Ind. C16	105
Minnequa,Colo. C10	110
Monessen,Pa. P7	103
Pittsburg,Calif. C11	122
Portsmouth,O. P12	103
Rankin,Pa. A7	103
So.Chicago,Ill. R2	103
SparrowsPoint,Md. B2	105
Sterling,Ill.(1) N15	103
Torrance,Calif. C11	123
Worcester,Mass. A7	109

NAILS & STAPLES, Stock (To Jobbers)

	Col.
Chicago,Ill. W13	103
Minnequa,Colo. C10	107
Portsmouth,O. P12	100

NAILS, Cut (100 lb keg)

Conshohocken,Pa. A3	$6.75
Wheeling,W.Va. W10	6.75

FENCE POSTS

	Col.
Duluth A7	112
Johnstown,Pa. B2	112
Joliet,Ill. A7	112
Minnequa,Colo. C10	120
Moline,Ill. R2	116
Williamspt,Pa., S19	n.t.120

AXLES

Fairfield,Ala. T2	5.20
Gary,Ind. C3	5.20
Ind.Harbor,Ind. S13	5.20
Johnstown,Pa. B2	5.20
McKeesRocks,Pa. C3	5.20

TIE PLATES

Fairfield,Ala. T2	4.05
Gary,Ind. C3	4.05
Ind.Harbor,Ind. I2	4.05
Lackawanna B2	4.05
Minnequa,Colo. C10	4.05
Pittsburg,Calif. C11	4.20
Pittsburgh R2	4.05
Seattle B3	4.50
Steelton,Pa. B2	4.05
Torrance,Calif. C11	4.20
Weirton,W.Va. W6	4.05

JOINT BARS

Bessemer,Pa. C3	4.25
Fairfield,Ala. T2	4.25
Ind.Harbor,Ind. I2	4.25
Joliet,Ill. C3	4.25
Lackawanna B2	4.25
Minnequa,Colo. C10	4.25
Steelton,Pa. B2	4.25

TRACK BOLTS (20) Treated

Fairfield,Ala. T2	8.50
Lebanon,Pa. B2	8.50
Minnequa,Colo. C10	8.25
Pittsburgh,Pa. O3, P14	8.50

STANDARD TRACK SPIKES

Fairfield,Ala. T2	5.35
Ind.Harbor,Ind. I2, Y1	5.35
Lebanon,Pa. B2	5.35
Minnequa, Colo. C10	5.35
Pittsburgh J5	5.35
So.Chicago,Ill. R2	5.35
Struthers,O. Y1	5.35
Youngstown R2	5.25

LIGHT RAILS, Rail Steel

Huntington,W.Va. W7	3.55
Youngstown R2	5.35

Key to Producing Companies

L7 Lukens Steel Co.
M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M10 Missouri-Illinois Furnace
M12 Moltrup Steel Products
M13 Monarch Steel Co.

N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N8 Newman Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S. & W. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P5 Pilgrim Drawn Steel Crp.
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P12 Portsmouth Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R7 Rotary Electric Steel Co.

S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 S monds Saw & Steel Co.
S9 Sloss Sheffield S. & I. Co.
S13 Standard Forgings Corp.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.

T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San. Corp.

U4 Universal Cyclops Steel

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Wstrn. Auto. Mach. Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Co.
W15 Woodward Iron Co.
W16 Worth Steel Co.
W18 Wyckoff Steel Co.
Y1 Youngstwn. Sheet & Tube

STANDARD PIPE, T. & C.

BUTTWELD

Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	41.5	39.5	38.5	13.5	11.5	10.5
¼	6.0	0.42	39.5	37.5	36.5	15.5	13.5	12.5
⅜	6.0	0.57	36	34	33	12.5	10.5	9.5
½	8.5	0.85	43	41	42	26.5	24.5	25.5
¾	11.5	1.13	46	44	45	30.5	28.5	29.5
1	17.0	1.68	48.5	46.5	47.5	33.5	31.5	32.5
1¼	23.0	2.28	49	47	48	34	32	33
1½	27.5	2.73	49.5	47.5	48.5	34.5	32.5	33.5
2	37.0	3.68	50	48	49	35	33	34
2½	58.5	5.82	50.5	48.5	49.5	35.5	33.5	34.5
3	76.5	7.62	50.5	48.5	49.5	35.5	33.5	34.5

Column A: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va. 1½ percentage point lower on ⅛", 2 points lower on ¼", 3 points lower ⅜", W10; Wheatland, Pa., 2 points lower on ⅛ through ⅜", W9. Following make ½ through 3" only: Lorain, O. N3; Youngstown R2, Y1; Aliquippa, Pa. J5.

Columns B & E: Sparrows Point, Md. B2; Wheatland, Pa., ⅛ through ⅜", W9.

Columns C & F: Alton, Ill. (Lorain, O. Base) LI; Indiana Harbor, Ind., ½ through 3", Y1.

Column D: Etna, Pa. N2; Monaca, Pa. P9, Sharon, Pa. M6; Butler, Pa., ⅛ through ⅜", F6; Benwood, W. Va., except 3½ points lower on ⅛", 2½ pts on ¼", 3 pts on ⅜" W10; Wheatland, Pa., except 2 pts lower on ⅛ through ⅜" W9. Following make ½ through 3" only; Lorain N3; Youngstown R2, Y1; Aliquippa, Pa. J5.

SEAMLESS AND ELECTRIC WELD

Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless —Black— A	Black B	—Galv.— C	Galv. D	Elec. Weld Black E	Elec. Weld Galv. F
2	37.0c	3.68	38.5	28	23	12.5	38.5	23
2½	58.5	5.82	41.5	33.5	26	18	41.5	26
3	76.5	7.62	41.5	36	26	20.5	41.5	26
3½	92.0	9.20	43.5	38.5	28	23	43.5	28
4	$1.09	10.89	43.5	38.5	28	23	43.5	28
5	1.48	14.81	43.5	43.5	28	28	43.5	28
6	1.92	19.18	43.5	43.5	28	28	43.5	28

Column A: Lorain N3; Ambridge N2; Youngstown Y1.
Columns B & D: Aliquippa, Pa. J5.
Column C: Lorain, O. N3; Youngstown Y1.
Columns E & F: Youngstown R2.

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	37.50	30.50	28.50
302	37.50	33.00	28.50
303	39.50	36.50	31.00
304	39.50	35.00	30.00
309	52.00	52.00	41.50
316	53.00	55.00	46.00
321	45.50	44.50	34.00
347	50.00	48.50	38.50
410	33.00	27.00	23.00
416	33.50	33.50	23.50
420	40.50	43.50	28.50
430	35.50	27.50	23.50
501	24.00	22.50	11.50
502	25.00	23.50	12.50

Baltimore, Types 301 through 347 sheets, except 309 E2
Baltimore, bars, wire and structurals A10
Brackenridge, Pa., sheets A4
Bridgeville, Pa., bars, wire, sheets & strip, except Type 309 strip quoted 51.00c U4
Butler, Pa., sheets except Types 501 & 502 A10
Carnegie, Pa., strip except Type 416; Type 309 strip quoted 51.00c S18.
Cleveland, strip, except Type 309 quoted 51.00c, and except Type 416 A7.
Detroit, strip, except Type 309 quoted 51.00 M1
Dunkirk, N.Y., bars, wire A4
Duquesne, Pa., bars C3
Gary, Ind., sheets except Type 416 C3
Harrison, N. J., strip C18
Massillon, all products, except Type 309 bars, wire & structurals quoted 42.00c, Type 501 10.50c, Type 502 11.50c R2
McKeesport, Pa., bars; sheets except Type 416, C3
McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2
Middletown, O., sheets and strip, except Types 501 and 502 and except 309 strip quoted 51.00c A10
Midland, sheets & strip C18
Munhall, Pa., bars C3
Pittsburgh, sheets C18
Reading, Pa., bars & strip except Type 309 bars quoted 42.00c C4
So. Chicago, Ind., bars & structurals C3
Syracuse, N. Y., bars, wire & structurals C18
Titusville, Pa., bars U4
Wallingford, Conn., strip W2
Washington, Pa., bars, sheets & strip except Type 309 strip quoted 51.00c J3
Washington, Pa., Types 301 through 347 sheets & strip except 303 & 309; 316 sheets 58.00c strip 60.00c W4
Watervliet, N. Y., structurals & bars A4
Waukegan, bars & wire A7
West Leechburg, Pa., strip, except Type 309 quoted 51.00c A4

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	19.00	18W,4Cr,3V	114.50
Extra Carbon	22.00	18W,4Cr,2V,9Co	168.50
Spec. Carbon	26.50	18W,4Cr,2V,6Co	154.00
Oil Hardening	29.00	18.25W,4.25Cr,1V,4.75Co	142.00
Md.-Carbon-Cr	52.00	20.25W,4.25Cr,1.6V,12.25Co	266.50
Cr Hot Wrk	29.00	1.5W,4Cr,1V,8.5Mo	65.00
18W,4Cr,1V	90.50	6.4W,4.5Cr,1.9V,5Mo	69.50
18W,4Cr,2V	102.50	6W,4Cr,3V,6Mo	88.00

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M9, R2, S8, T7, U4, V2, V3.

(1) Chicago Base. (2) Angles.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. Base.
(7) Deformed.
(8) 16 gage and heavier.
(9) 6" and narrower.
(10) Pittsburgh Base.
(11) Cleveland & Pittsburgh Base.
(12) Worcester, Mass. Base.
(13) 3" & wider; over ½" to under 3" 5.00c.
(14) Also wide flange beams.
(15) ½" and thinner.
(16) 40 lb and under.
(13) 3" & wider; over ½" to under 3" 5.00c.
(18) To dealers.
(19) Chicago & Pittsburgh Base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. Base.
(22) Del. San. Fran. Bay area.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace	$13.00-13.50
Connellsville, foundry	15.50-16.00
New River, foundry	18.00
Wise county, foundry	15.35
Wise county, furnace	14.60

Oven Foundry Coke

Kearney, N. J., ovens	$22.00
Everett, Mass., ovens, New England, del.‡	22.70
Chicago, ovens	20.00
Chicago, del.	†21.45
Detroit, del.	23.91
Terre Haute, ovens	20.20
Milwaukee, ovens	20.75
Indianapolis, ovens	19.85
Chicago, del.	23.32
Cincinnati, del.	22.77
Detroit, del.	23.75
Ironton, O., ovens	19.40
Cincinnati, del.	21.63
Painesville, O., ovens	20.90
Buffalo, del.	23.02
Cleveland, del.	22.62
Erie, del.	21.04
Birmingham, ovens	17.70
Philadelphia, ovens	20.45
Swedeland, Pa., ovens	20.40
Portsmouth, O., ovens	19.50
Detroit, ovens	20.65
Detroit, del.	*21.70
Buffalo, del.	22.95
Flint, del.	23.00
Pontiac, del.	21.98
Saginaw, del.	23.30

Includes representative switching charge of: *, $1.05; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. ‡ Or within freight zone from works. $4.03

Coal Chemicals

Spot, cents per gallon, ovens	
Pure benzol	20.00
Toluol, one degree	19.00-23.50
Industrial xylol	20.50-26.50
Per ton bulk, ovens	
Sulphate of ammonia	$45.00
Per pound, ovens	
Phenol, 40 (carlots, returnable drums)	13.25
Do., less than carlots	14.00
Do., tank cars	12.50

Refractories

(Prices per 1000 brick, f.o.b. plant)

Fire Clay Brick

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $100. Hard-fired, $135 at above points.

High-heat Duty: Salina, Pa., $85; Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $80.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $74.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., Ottawa, Ill., $66.

Ladle Brick

Dry Press: $55, Freeport, Merill Station, Clearfield, Pa., Chester, New Cumberland, W. Va.; Irondale, Wellsville, O.

Wire Cut: $53, Chester, New Cumberland, W. Va.; Wellsville, O.

Malleable Bung Brick

St. Louis, Mo., Olive Hill, Ky., Ottawa, Ill., $90; Beach Creek, Pa., $80.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Ensley, Ala., $80; Hays, Pa., $85; Joliet or Rockdale, Ill., E. Chicago, Ind., $89; Lehi, Utah, Los Angeles, $95.

Eastern Silica Coke Oven Shapes: Claysburg, Mt. Union, Sproul, Pa., Birmingham, $80.

Illinois Silica Coke Oven Shapes: Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $81.

Basic Brick

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.) Burned chrome brick, $66; Chemical-bonded chrome brick, $69; magnesite brick, $91; chemical-bonded magnesite, $80.

Magnesite

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains; Bulk, $30.50-31.00; single paper bags, $35.00-35.50.

Dolomite

(Base prices per net ton)

Domestic, dead-burned bulk: Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Narlo, Millersville, Martin, Gibsonburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Bonne Terre, Mo., $12.45.

Electrodes

(Threaded, with nipples, unboxed)

Inches Diam.	Length	Cents per lb. f.o.b. plant
	Graphite	
17, 18, 20	60, 72	16.00
8 to 16	48, 60, 72	16.50
7	48, 60	17.75
6	48, 60	19.00
4, 5⅛	40	19.50
3	40	20.50
2½	24, 30	21.00
2	24, 30	23.00
	Carbon	
40	100, 110	7.50
35	100, 110	7.50
30	84, 110	7.50
24	72 to 104	7.50
17 to 20	84, 90	7.50
14	60, 72	8.00
10, 12	60	8.25
8	60	8.50

Fluorspar

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural) Lower Lake Ports

(Any increase or decrease in R.R. freight rates, dock handling charges and taxes thereon are for buyer's account.)

Old range bessemer	$7.60
Old range nonbessemer	7.45
Mesabi bessemer	7.35
Mesabi nonbessemer	7.20
High phosphorus	7.20

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.62% concentrates, contract	16.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot:	17.00
Long-term contract	15.00
Brazil iron ore, 68-69%	19.50

Tungsten Ore

Wolframite scheelite, net ton unit, duty pd.	$26-$28

Manganese Ore

Long term contracts, nominal; nearby, 48%, duty paid, 81.8c-83.8c per long ton unit, c.i.f. U.S. ports; prices on lower grades adjusted to Mn content and impurities.

Chrome Ore

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S.C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.8:1	37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$25.50-26.00
45% no ratio	26.50
48% no ratio	29.00-30.00
50% no ratio	29.50-30.50
Brazilian—nominal	
44% 2.5:1 lump	$33.65
Rhodesian	
45% no ratio	$27-27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb, Mo., cont. Mines	$0.90

WAREHOUSE STEEL PRICES

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga. and Heavier*	C.R. 15 Ga.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	5.60	6.51	7.10	5.82	...	5.77	6.31	8.28	5.53	5.85	7.36
New York (c'try)	5.40	6.31	6.90	5.62	...	5.57	6.11	8.08	5.33	5.65	7.16
Boston (city)	5.75	6.75**	7.16	5.80	...	5.72	6.22	8.77	5.62	5.95	7.45
Boston (c'try)	5.55	6.55**	6.96	5.60	...	5.52	6.02	8.57	5.42	5.75	7.25
Phila. (city)	5.80	6.39	6.78	5.55	...	5.55	6.09-6.11	8.00	5.25	5.50	6.70
Phila. (c'try)	5.65	6.24	6.63	5.40	...	5.40	5.94-5.96	7.85	5.10	5.35	6.55
Balt. (city)	5.46	6.36	6.81	5.52	...	5.57	6.31	...	5.51	5.71	7.16
Balt. (c'try)	5.31	6.21	6.66	5.37	...	5.42	6.16	...	5.36	5.56	7.01
Norfolk, Va.	5.80‡	...	...	...	...	6.05	7.05	...	6.05	6.05	7.55
Wash. (w'hse)	6.07‡	...	...	5.83	...	5.88	6.62	...	5.82	6.02	7.47
Buffalo (del.)	5.00‡	5.90	7.57	5.39	6.42	5.10	5.60	10.13	5.15	5.50	7.06
Buffalo (w'hse)	4.85‡	5.75	7.42	5.24	6.27	4.95	5.40	9.60	5.00	5.35	6.91
Pitts. (w'hse)	4.85	5.75[4]*	6.80	5.00	6.00	4.90	5.40	9.20††	4.90	5.05	6.55
Detroit (w'hse)	5.32	6.22[4]*	7.35	5.42	6.42-6.73	5.48	5.90	8.44-8.59	5.48	5.67	7.02
Cleveland (del.)	5.00	5.90	6.70	5.15-5.18	6.15	5.15-5.16	5.60	7.84-8.00	5.15-5.16	5.35-5.36	6.80-6.81
Cleve. (w'hse)	4.85	5.75	6.55	5.00-5.03	6.00	5.00-5.01	5.45	7.84-7.85	5.00-5.01	5.20-5.21	6.65-6.66
Cincin. (w'hse)	5.26‡	5.94**	6.83	5.38	6.10	5.43	5.94	...	5.43	5.63	7.03
Chicago (city)	5.05	5.95[4]	7.05	5.05	6.35-6.85	5.10	5.60	7.90[5]	5.10	5.30	6.75
Chicago (w'hse)	4.85	5.75[4]	6.85	4.85	6.15-6.65	4.90	5.40	7.70[5]	4.90	5.10	6.55
Milwaukee (city)	5.18	6.08[4]	7.18	5.18	6.48-6.98	5.23	5.78	8.03[5]	5.23	5.43	6.88
St. Louis (del.)	5.37	6.27[4]	7.44	5.34	6.64	5.39	6.19[6]	6.64	5.39	5.59	7.04
St. L. (w'hse)	5.22	6.12[4]	7.29	5.19	6.49	5.24	6.04[6]	6.49	5.24	5.44	6.89
Birm'ham (city)	5.00	5.90	6.55	5.00	...	5.00	6.83	...	5.05	5.25	7.69
Birm'ham (c'try)	4.85	5.75	6.40	4.85	...	4.85	6.68	...	4.90	5.10	7.54
Omaha, Nebr.	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Los Ang. (city)	6.60	8.05**	7.60	6.80	7.75	6.25	8.20	...	6.10	6.30	8.20
L. A. (w'hse)	6.45	7.90**	7.45	6.65	7.60	6.10	8.05	...	5.95	6.15	8.05
San Francisco	6.15[10]	7.50[3]	8.10	6.75[10]	8.25[8]	5.90[10]	7.55	10.85[2]	5.90	6.35	8.10
Seattle-Tacoma	6.70[7]‡	8.15[3]	8.80	6.70[7]	...	6.20[7]	8.15[1]	10.35	6.00[7]	6.35[7]	8.40[7]

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); § as rolled; ** 17 gage; †† as annealed.

Base quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 1000 lb and over; galvanized sheets, 450 lb to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [3]—450 to 1499 lb; [4]—40 to 1499 lb; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—300 to 999 lb; [8]—1500 to 1999 lb; [9]—400 to 3999 lb; [10]—400 lb and over; [11]—500 to 1499 lb.

PRICES OF LEADING FERROALLOY PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si) Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, c.l., packed, $184; gross ton lots, packed, $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Manganese, Electrolytic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 35,999 lb, 30c; 36,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17.5%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., 8MxD, bulk 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lots 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max. 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 17.00c per lb of contained Si; packed 18.40c; ton lot 19.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices. **75% Ferrosilicon:** Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices. **90-95% Ferrosilicon:** Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l., lump, bulk, regular 19.0c per lb of Si c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.40c per lb of alloy, ton lots packed 8.80c, 200 to 1999 lb 9.15c, smaller lots 9.65c. Delivered. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk, 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.28, less ton $1.35. F.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%). Contract, $175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

VANADIUM ALLOYS

Ferrovanadium: Open-Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.). Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.), $3.10.

Grainal: Vanadium Grainal No. 1, 93c; No. 6 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots, $1.20 per lb of contained V_2O_5, freight allowed. Spot, add 5c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered, Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more. 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50

Borosil: (3 to 4% B, 40 to 45% Si), $4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Contract, ton lot, 2" x D, $2.90 per lb of contained Cb, less ton $2.95. Delivered. Spot, add 25c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 53-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Carload, 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8% Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Carload packed. 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, M 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.50c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed. 17.00c per lb of alloy; ton lots 18.00c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal (Approx. 20% each Si, Mn, Al). Lump, bulk, carload 11.00c. Ton lots, bulk 11.50c, packed 11.75c. Less ton lots, packed 12.55c per lb of alloy, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Ferrophosphorus (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); Gross tons per carload, f.o.b. sellers' works, Mt. Pleasant, or Siglo, Tenn.; $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.10.

Technical Molybdic-Oxide: Per lb, contained Mo., f.o.b. Langeloth and Washington, Pa., packed in bags containing 20 lb of molybdenum, 95.00c.

Metal Price Tone Remains Firm

Postponement of steel strike until at least Sept. 25 has strengthening effect on zinc market. Developments on labor front hold key to future general industrial activity

New York—Postponement of the steel strike to at least Sept. 25 tended to strengthen the undertone of the primary zinc market, since galvanizing operations at steel plants will be uninterrupted immediately by that factor. Developments on the labor front hold the key to future general industrial activity and, hence, for those industries consuming large tonnages of lead, copper and other nonferrous metals.

Copper—August copper statistics revealed a stronger position than had been expected. Deliveries to fabricators jumped to 90,739 tons from 45,316 tons in July and compared with 107,496 tons for the like month a year ago. Production of refined copper was well under that figure at 85,577 tons, practically unchanged from the July total and comparing with 102,798 tons for August, 1948.

Crude copper production from primary sources held steady at 56,232 tons, while output from secondary sources amounted to 6337 tons compared with 6089 tons in July. Due apparently to an undelivered excess of about 10,000 tons of foreign refined metal, stocks of refined copper at the end of August showed an increase of 4350 tons, or to a total of 217,817 tons. This compares with stocks of only 68,450 tons at the end of March, the low for the last 12 months.

On the basis of bookings already made, trade authorities are predicting deliveries to customers in September will closely approach the 100,000-ton level. This would be the heaviest movement recorded since March when they amounted to 113,154 tons.

Supported by steady demand which is absorbing available supplies, the undertone of the market is firm on the basis of 17.62½c a pound, delivered Connecticut Valley, for electrolytic.

Lead—Bulk of business now being transacted in the domestic lead market is for October delivery, prices holding at 14.92½c, St. Louis. Battery manufacturers and cable makers are placing a substantial volume of business. Most suppliers have disposed of all tonnages available for delivery in September, although occasional lots are being booked. This indicates that some users are still operating on extremely thin inventories.

Zinc—Many of the large users of slab zinc continue to await developments in the steel labor controversy before placing additional orders for the metal. Dullness in the market is attributed partly also to the general belief that some consumers bought heavily at the lower level of the split market earlier this month when a range of 10.00c to 10.50c was quoted. The present market is steady at 10.00c, East St. Louis.

Tin—Receipts of pig tin by the Reconstruction Finance Corp. during August amounted to 8185 tons, including 5180 tons in imports and 3005 tons from smelter output, bringing the total for the first eight months to 62,552 tons against 55,214 tons in the like 1948 period. Allocations to buyers amounted to 4418 tons, making the total for the first eight months 27,534 tons against 40,311 tons for the like period a year ago. Although receipts were 3767 tons in excess of allocations, RFC's stocks declined 9443 tons, indicating that some 13,200 tons were transferred to the permanent stockpile.

Trading in tin continues almost at a standstill on the consignment-deferred pricing basis put into effect by the British Ministry of Supply. The possibility of a devaluation of currencies by certain countries, as recommended by the International Monetary Fund, is contributing to the dullness in the tin market. Chinese tin, 99 per cent grade, is being offered for September and October shipment from Hong Kong. Prices quoted are around 80.00c to 90.00c for September shipment and 88.00c to 89.00c for October shipment. Metal afloat and due to arrive in October is quoted 91.00c to 92.00c.

Zinc Production Slumps

Washington—Domestic mine production of zinc slumped sharply in July to 40,996 short tons, a 24 per cent decline from the June output, and the smallest monthly production since July, 1946, reports the Bureau of Mines. Important factors contributing to the July decrease were numerous mine shutdowns due to lower metal prices, a work stoppage at the Eagle-Picher Mining & Smelting Co., Miami, Okla., caused by labor-management disagreement regarding new contract provisions, and a three-week shutdown of the American Zinc Co. operations in Tennessee for vacation purposes. The July zinc output was produced at an average daily rate of 1322 tons whereas the 53,599-ton production in June was at a rate of 1787 tons.

Zinc output in states east of the Mississippi river dropped 12 per cent, largely the result of mine closures in Tennessee for employees' vacations. The Athletic mine of the American Zinc Co. was shut down during the month without plans for reopening.

In Arkansas, Kansas, Missouri, and Oklahoma the combined zinc output declined 70 per cent to the lowest level since the beginning of this series of monthly reports in 1941.

July Lead Output Drops

Washington—Average daily rate of lead output from domestic mines in July declined 19 per cent from the June level, reports the Bureau of Mines. Owing to the numerous mine shutdowns because of low-metal prices, July lead output, in terms of recoverable metal, dropped to 30,273 short tons, an average of 977 tons per day compared with 36,162 tons in June produced at an average rate of 1205 tons per day.

In Arkansas, Kansas, Missouri, and Oklahoma the combined lead output declined 17 per cent to the lowest level since September, 1948. In the Tri-State district lead production fell off 78 per cent from June and was the lowest in any month since the beginning of this series of monthly reports in 1941.

In the Western States the July mine output of recoverable lead was the lowest since December, 1947. Production was 17 per cent under the June figure as virtually every state recorded a decline in output.

Supports Metals Research

Chicago—Reynolds Metals Co. and the Procter & Gamble Co. have become industrial sponsors of the University of Chicago's $12 million basic atomic and metals research program, Lynn A. Williams, university vice president in charge of development, announces.

Reynolds Metals Co. has become an industrial member of the Institute of Metals, to the support of which it will contribute $20,000 a year. Procter & Gamble Co. has taken a similar membership in the Institute of Radiobiology and Biophysics.

These two newest additions bring the number of industrial sponsors of the research program, which also includes the Institute for Nuclear Studies, to twenty. Since the industrial sponsorship program was initiated in the summer of 1947, $4 million has been pledged for support of the institutes over a five year period. The institutes are conducted solely by the University of Chicago and not as part of a government undertaking.

Other sponsors of the Institutes are: Aluminum Co. of America, Shell Development Co., Inland Steel Co., Standard Oil Development Co., Standard Oil Co. (Indiana), Westinghouse Electric Corp., Pittsburgh Plate Glass Co., Sun Oil Co., United States Steel Corp., Celanese Corp. of America, Bethlehem Steel Co., Commonwealth Edison Co., Crane Co., American Tobacco Co., Beech-Nut Packing Co., E. I. du Pont de Nemours & Co., Fairchild Engine & Airplane Corp., and International Harvester Co.

Mineral Glossary Republished

Washington—Out of print for many years, the *Albert H. Fay Glossary of the Mining and Mineral Industry* has been republished by the Bureau of Mines; copies may be had at $1.75 from Superintendent of Documents, Government Printing Office, Washington 25, D. C. Containing some 20,000 definitions, it presents in one column the available standard, technical and purely local terms related to metal mining, coal mining, quarrying, petroleum and natural gas production, metallurgy and geology.

NONFERROUS METAL PRICES

(Cents per pound, carlots, except as otherwise noted)

Copper: Electrolytic 17.62½c, Conn. Valley, Lake, 17.75c, Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 15.50-16.50c; 88-10-2 (No. 215) 24.50c; 80-10-10 (No. 305) 21.00c; No. 1 yellow (No. 405) 13.25-14.25c.

Zinc: Prime western 10.00c, brass special 10.25c, intermediate 10.50c, East St. Louis; high grade 11.00c, delivered.

Lead: Common 14.92½c; chemical 15.02½c; corroding 15.02½c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, f.o.b. shipping point.

Secondary Aluminum: Piston alloys 16.00-16.50c; No. 12 foundry alloy (No. 2 grade) 15.25-15.75c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 17.25c; grade 2, 16.25c; grade 3, 15.25c; grade 4, 14.25c. Prices include freight at carload rate up to 75 cents per 100 lb.
5% titanium-aluminum alloy No. 1 (low Cu) 31.00c; No. 2 (2% Cu) 28.00c, f.o.b. Eddystone, Pa.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, f.o.b. Freeport, Tex.

Tin: Grade A, 99.8% or higher (including Straits) $1.03; grade B, 99.8% or higher, not meeting specifications for grade A, with 0.05% max. arsenic, $1.028; grade C, 99.65-99.79%, incl., $1.024; 99.5-99.649% $1.024; grade F, 99-98.999% $1.015 for tin content. Prices are ex-dock, New York, in 5-ton lots.

Antimony: American 99-99.8% and over but not meeting specifications below, 38.50c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 39.00c, f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $72-$75 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadminum: "Regular" straight or flat forms, $2 del.; special or patented shapes, $2.15.

Cobalt: 97-98%, $1.80 per lb for 550 lb (keg); $1.82 per lb for 100 lb (case); $1.87 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 73.25c per ounce.

Platinum: $69-$72 per ounce.

Palladium: $24 per troy ounce.

Iridium: $100-$110 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; based on 16-cent copper.)

Sheet: Copper 31.30; yellow brass 28.19; commercial bronze, 95%, 31.28; 90%, 30.84; red brass, 85%, 29.89; 80%, 29.47; best quality, 29.01; nickel silver, 18%, 41.78; phosphor-bronze, grade A, 5%, 50.47.

Rods: Copper, hot rolled 27.15; cold drawn 28.40; yellow brass free cutting, 22.76; commercial bronze, 95% 30.97; 90% 30.53; red brass 85% 29.58; 80% 29.16.

Seamless Tubing: Copper 31.34, yellow brass 31.20; commercial bronze 90% 33.50; red brass 85% 32.80; 80% 32.38.

Wire: Yellow brass 28.48; commercial bronze, 95% 31.57; 90% 31.13; red brass, 85% 30.18; 80% 29.76; best quality brass 29.30.

Copper Wire: Bare soft, f.o.b., eastern mills, 100,000 lb lots 22.42½, l.c.l. 23.05, c.l. 22.55; weatherproof, f.o.b. eastern mills, 100,000 lb lots 24.693, l.c.l. 25.443, c.l. 24.943; magnet, delivered, c.l. 27.62½, 15,000 lb or more 27.87½, l.c.l. 28.37½.

ALUMINUM

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-20	36.8	33.4	39.5
0.008-0.0075	12-20	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	—Hexagonal— R317-T4	—Hexagonal— 17S-T4
0.125	48.0	...	...
0.156-0.203	41.0	...	...
0.219-0.313	38.0	...	...
0.344	37.0	...	47.0
0.375	36.5	45.5	44.0
0.406	36.5	...	...
0.438	36.5	45.5	44.0
0.469	36.5	...	...
0.500	36.5	45.5	44.0
0.531	36.5	...	...
0.563	36.5	...	41.5
0.594	36.5	...	...
0.625	36.5	43.0	41.5
0.656	36.5	...	...
0.688	36.5	...	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	...	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	...	37.5
1.625	33.5	...	36.5
1.688-2.000	33.5	...	...
2.125-2.500	32.5	...	...
2.625-3.375	31.5	...	...

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $20.12½ per cwt; add 50c per cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, $20.12½ per cwt. Traps and Bends: List price plus 55%.

ZINC

Sheets, 15.50c f.o.b. mill, 36,000 lb and over Ribbon zinc in coils, 15.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 14.00c; over 12-in., 15.00c.

NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton, 27.00c.

Copper Anodes: Base, 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 27.96c; oval 27.46c; cast 25.99c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 25.25c; over 250 lb, 24.25c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 10 lb, 64.00c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbl, 24.50c, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over, 119.00c; 500 to 999 lb, 119.50c; 200 to 499 lb, 120.00c; less than 2090 lb, 121.50c; ball, 1000 lb and over, 121.25c; 500 to 999 lb, 121.75c; 200 to 499 lb, 122.25c; less than 200 lb, 123.75c f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 71.8c; 100 or 300 lb drums only, 100 to 500 lb, 63.6c; 600 to 1900 lb, 61.2c; 2000 to 9900 lb, 59.4c, f.o.b. Sewaren, N. J. On 100 or 350 drums only, 100 to 600 lb, 63.3c; 700 to 1900 lb, 60.9c; 2000 to 9900 lb, 59.1c; 10,000 lb and over, 58.00c, f.o.b. Carteret, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100-lb drums 40.50c, f.o.b. Cleveland; 39.25c, Detroit; 39.25c, Philadelphia.

Stannous Sulphate: Less than 2000 lb in 100 lb kegs, 100.00c, in 400 lb bbl, 99.00c; more than 2000 lb, in 100 lb kegs, 99.00c, in 400 lb bbl, 98.00c, f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, 88.00c; 100 lb kegs, 89.00c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	14.62½	14.62½	13.87½
Yellow brass	12.00	11.75	11.00
Commercial Bronze			
95%	13.62½	13.37½	12.87½
90%	13.50	13.25	12.75
Red brass			
85%	13.25	13.00	13.12½
80%	13.00	12.75	12.25
Best Quality (71-80%)	12.87½	12.62½	12.12½
Muntz Metal	11.12½	10.87½	10.37½
Nickel, silver, 10%	14.00	13.75	7.00
Phos. bronze, A	16.37½	16.12½	15.12½
Naval brass	11.62½	11.37½	10.87½
Manganese bronze	11.62½	11.37½	10.75

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 14.50; No. 2 copper 13.50; light copper 12.50; composition red brass 11.25-11.50; radiators 9.25; heavy yellow brass 9.00-9.25.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 14.50-14.75; No. 2 copper 13.50-13.75; light copper 12.50-12.75; refinery brass (60% copper) per dry copper content 12.37½-12.50.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and Brass: Heavy copper and wire No. 1 12.75-13.00; No. 2 11.75-12.00; light copper 10.75-11.00; No. 1 composition red brass 9.25-9.50, No. 1 composition turnings 8.75-9.00, mixed brass turnings 5.75-6.00; new brass clippings 10.00-10.50, No. 1 brass rod turnings 7.75-8.00; light brass 5.75-6.00; heavy yellow brass 6.25-6.50; new brass rod ends 7.75-8.00; auto radiators, unsweated 7.75-8.00; cocks and faucets, 7.50-7.75; brass pipe 8.25-8.50.

Lead: Heavy 11.25-11.75, battery plates 6.50-6.75, linotype and stereotype 11.75-12.00, electrotype 10.50-11.00, mixed babbitt 11.75-12.00, solder joints, 14.50-15.00.

Zinc: Old zinc 4.00-4.50, new die cast scrap 3.50-4.00, old die cast scrap 2.50.

Tin: No. 1 pewter 52.00-54.00, block tin pipe 70 00-72.00, No. 1 babbitt 40.00-42.00.

Aluminum: Clippings 2S 10.00-10.50, old sheets 7.00-7.50, crankcase 7.00-7.50, borings and turnings 3.00-3.50.

DAILY PRICE RECORD

1949	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Sept. 8-14	17.62½	14.92½	10.00	103.00	17.00	38.50	40.00	73.25
Sept. 7	17.62½	14.92½	10.00–10.50	103.00	17.00	38.50	40.00	73.25
Sept. 1-6	17.62½	14.92½	10.00–10.50	103.00	17.00	38.50	40.00	73.00
Aug. Avg.	17.625	14.806	10.000	103.00	17.000	38.500	40.000	71.889
July Avg.	17.279	13.335	9.346	103.000	17.000	38.500	40.000	71.500
June Avg.	16.606	11.850	9.548	103.000	17.000	38.500	40.000	71.500

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

STEELMAKING SCRAP COMPOSITE

Sept. 15	$26.92
Sept. 8	25.17
Aug. 1949	20.86
Sept. 1948	43.33
Sept. 1944	18.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 Heavy Melt.	$29.50-30.00
No. 2 Heavy Melt.	27.50-28.00
No. 1 Busheling	29.50-30.00
No. 1 Bundles	29.50-30.00
No. 2 Bundles	27.50-28.00
No. 3 Bundles	26.50-27.00
Heavy Turnings	21.00-22.00*
Machine Shop Turnings	17.50-18.00†
Mixed Borings, Turnings	17.50-18.00†
Short Shovel Turnings	19.00-20.00
Cast Iron Borings	18.00-19.00
Low Phos. Steel	31.00-32.00*

Cast Iron Grades

No. 1 Cupola Cast	34.00-35.00
No. 1 Machinery Cast	38.00-39.00
Charging Box Cast	30.00-31.00*
Heavy Breakable Cast	28.00-29.00*
Brake Shoes	30.00-31.00*

Railroad Scrap**

No. 1 R.R. Heavy Melt.	32.00-32.50
Axles	36.00-37.00
Rails, Random Length	35.00-36.00
Rails, 2 ft and under	39.00-40.00
Rails, 18 in. and under	40.00-41.00
Railroad Specialties	33.00-34.00
Angles, Splice Bars	33.00-34.00

* Nominal.
** Brokers' purchase prices.
† Crushers' buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	$25.00†
No. 2 Heavy Melt. Steel	24.00†
No. 1 Busheling	25.00†
No. 1 Bundles	25.00†
No. 2 Bundles	22.00†
Machine Shop Turnings	16.00†
Mixed Borings, Turnings	18.00†
Short Shovel Turnings	18.00†
Cast Iron Borings	18.00†
Bar Crops and Plate	26.00†
Punchings & Plate Scrap	26.00†
Cut Structurals	28.00†

† Nominal.

Cast Iron Grades†

No. 1 Cupola	39.00-40.00
Charging Box Cast	33.00-34.00
Stove Plate	34.00-35.00
Heavy Breakable Cast	31.00-32.00
Unstripped Motor Blocks	29.50-30.50
Malleable	33.00-34.00
Brake Shoes	30.00-31.00
Clean Auto Cast	41.00-42.00
No. 1 Wheels	34.00-35.00
Burnt Cast	31.00-32.00

† Nominal.

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.00-33.00
R.R. Malleable	34.00-35.00
Rail, 3 ft and under	38.00-39.00
Rails, Random Lengths	32.00-33.00
Cast Steel	27.00-28.00
Railroad Specialties	31.00-32.00
Uncut Tires	30.50-31.00
Angles, Splice Bars	34.00-35.00

VALLEY

No. 1 Heavy Melt. Steel	$29.00-30.00
No. 2 Heavy Melt. Steel	28.00-29.00
No. 1 Bundles	29.00-30.00
No. 2 Bundles	25.00-26.00
Machine Shop Turnings	19.00-20.00
Short Shovel Turnings	21.00-22.00
Cast Iron Borings	21.00-22.00
Low Phos.	30.00-31.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.00-33.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$24.00-25.00*
No. 2 Heavy Melt. Steel	22.00-23.50*
No. 1 Busheling	22.50-23.50*
No. 1 Bundles	24.00-25.00*
No. 2 Bundles	21.50-22.00*
Machine Shop Turnings	16.00-17.00
Short Shovel Turnings	17.00-18.00
Mixed Borings, Turnings	16.00
Bar Crop and Plate	25.50-26.50
Punchings & Plate Scrap	25.50-26.50
Cut Structurals	24.50-25.50
Elec. Furnace Bundles	24.00-24.50
Heavy Turnings	24.00
No. 1 Chemical Borings	21.00-22.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00
No. 1 Machinery Cast	38.00
Charging Box Cast	33.00-34.00
Heavy Breakable Cast	33.00-34.00
Unstripped Motor Blocks	30.00
Clean Auto Cast	38.00
No. 1 Wheels	34.00-35.00
Malleable	36.00-37.00

* Nominal.

CINCINNATI

No. 1 Heavy Melt. Steel	$23.00
No. 2 Heavy Melt. Steel	21.00
No. 1 Busheling	23.00
No. 1 Bundles	23.00
No. 2 Bundles	19.00
Machine Shop Turnings	11.00
Mixed Borings, Turnings	14.00
Short Shovel Turnings	14.00
Cast Iron Borings	14.00

Cast Iron Grades

No. 1 Cupola Cast	38.00
Charging Box Cast	31.00
Heavy Breakable Cast	32.00
Stove Plate	29.00
Unstripped Motor Blocks	20.00
Brake Shoes	21.00
Clean Auto Cast	38.00
Drop Broken Cast	42.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	26.00
R.R. Malleable	31.00
Rails, Rerolling	35.00
Rails, Random Lengths	34.00
Rails, 18 in. and under	42.00

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	$20.00-21.00
No. 1 Bundles	23.00-24.00
No. 2 Bundles	20.00-21.00
No. 1 Busheling	23.00-24.00
Machine Shop Turnings	15.00-16.00
Mixed Borings, Turnings	15.00-16.00
Short Shovel Turnings	17.00-18.00
Cast Iron Borings	17.00-18.00
Punchings & Plate Scrap	23.00-24.00

Cast Iron Grades

No. 1 Cupola Cast	32.00-33.00
Heavy Breakable Cast	28.00-29.00
Clean Auto Cast	32.00-32.00

BUFFALO

No. 1 Heavy Melt. Steel	$26.00-26.50
No. 2 Heavy Melt. Steel	23.50-24.00
No. 1 Bushelings	24.00-24.50
No. 1 Bundles	25.00-25.50
No. 2 Bundles	21.50-22.00
Machine Shop Turnings	16.00-16.50
Mixed Borings, Turnings	18.00-18.50
Cast Iron Borings	18.00-18.50
Short Shovelings	18.00-18.50
Low Phos.	28.00-28.50

Cast Iron Grades

No. 1 Cupola	36.00-37.00
No. 1 Machinery	37.00-37.50
Mixed Yard	35.00-35.50
Malleable	35.50-36.00

Railroad Scrap

Rails, 3 ft. and under	31.50-32.00
Scrap rails	28.50-29.00
Specialties	29.50-30.00
No. 1 car wheels	29.50-30.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	$18.50
No. 2 Heavy Melt. Steel	16.00-17.00
No. 1 Busheling	15.00-16.00
No. 1 Bundles	18.00-18.50
No. 2 Bundles	14.00-15.00
No. 3 Bundles	nominal
Machine Shop Turnings	9.00-10.00
Mixed Borings, Turnings	9.00-10.00
Short Shovel Turnings	10.00-11.00
Punchings & Plate Scrap	20.00-21.00
Cut Structurals	20.00-21.00
Elec. Furnace Bundles	20.00-21.00

Cast Iron Grades

No. 1 Cupola Cast	27.00-28.00
No. 1 Machinery	30.00
Charging Box Cast	25.00-26.00
Heavy Breakable	25.00-26.00
Unstripped Motor Blocks	22.00
Malleable	27.00-28.00

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	$14.00-14.50
No. 2 Heavy Melt. Steel	12.00-13.50
No. 1 Bundles	14.00-14.50
No. 1 Busheling	10.50-11.00
Machine Shop Turnings	6.50-7.00
Mixed Borings, Turnings	6.50-7.50
Short Shovel Turnings	7.50-8.50
Bar Crops and Plate	14.50-15.50
Punchings & Plate Scrap	14.50-15.50
Chemical Borings	10.50-11.00

Cast Iron Grade

No. 1 Cupola Cast	23.00-24.00
Mixed Cast	21.00-22.00
Heavy Breakable Cast	16.00-17.00
Stove Plate	19.00-20.00
Unstripped Motor Blocks	17.00-18.00

CHICAGO

No. 1 Heavy Melt. Steel	$26.00-27.00
No. 2 Heavy Melt. Steel	24.00-25.00
No. 1 Bundles	26.00-27.00
No. 2 Bundles	22.00-23.00
No. 3 Bundles	17.00-18.00
Machine Shop Turnings	16.00-17.00
Mixed Borings, Turnings	16.00-17.00
Short Shovel Turnings	17.00-18.00
Cast Iron Borings	16.00-17.00
Bar Crops and Plate	29.00-31.00
Punchings	29.00-31.00
Elec. Furnace Bundles	25.00-26.00
Heavy Turnings	23.00-24.00
Cut Structurals	27.00-28.00

Cast Iron Grades

No. 1 Cupola Cast	41.00-42.00
Clean Auto Cast	41.00-42.00
No. 1 Wheels	33.00-34.00
Stove Plate	29.00-30.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	31.00-32.00
Malleable	34.50-35.50
Rails, Rerolling	41.00-42.00
Rails, Random Lengths	34.50-35.50
Rails, 2 ft. and under	38.00-39.00
Rails, 18 in. and under	39.00-40.00
Railroad Specialties	33.00-34.00
Angles, Splice Bars	35.50-36.50

ST. LOUIS

No. 1 Heavy Melt. Steel	$25.00-26.00
No. 2 Heavy Melt. Steel	21.00-22.00
Machine Shop Turnings	17.00
Short Shovel Turnings	18.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00
Charging Box Cast	30.00-32.00
Heavy Breakable Cast	27.00-28.00
Brake Shoes	29.00-30.00
Clean Auto Cast	36.00-38.00
Burnt Cast	29.00-30.00

Railroad Scrap

R.R. Malleable	30.00-31.00
Rails, Rerolling	36.00-37.00
Rails, Random Lengths	31.00-32.00
Rails, 3 ft. and under	35.00-37.00
Uncut Tires	25.00-26.00
Angles, Splice Bars	34.00-35.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$22.00
No. 2 Heavy Melt. Steel	22.00
No. 1 Busheling	18.00
No. 2 Bundles	20.00
Machine Shop Turnings	15.00
Mixed Borings, Turnings	15.00
Short Shovel Turnings	17.00
Cast Iron Borings	17.00
Bar Crops and Plate	28.00
Cut Structurals	23.00

Cast Iron Grades

No. 1 Cupola Cast	34.50
Stove Plate	28.00-30.00
No. 1 Wheels	23.00-24.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	28.50
R. R. Malleable	nominal
Rails, Rerolling	30.00
Rails 3 ft. and under	25.00-26.00
Angles and Splice Bars	29.50

SAN FRANCISCO

No. 1 Heavy Melt. Steel	$17.00
No. 2 Heavy Melt. Steel	15.00
Nos. 1 & 2 Bundles	13.00

Cast Iron Grades

No. 1 Cupola Cast	23.00-25.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	17.00
Wheels	17.00
Rails, Random Lengths	17.00

SEATTLE

No. 1 Heavy Melt. Steel	$16.00
No. 2 Heavy Melt. Steel	16.00
No. 1 Bushelings	13.50
Nos. 1 & 2 Bundles	14.00
No. 3 Bundles	nom.
Machine Shop Turnings	11.00
Mixed Borings, Turnings	11.00
Punchings & Plate Scrap	22.00
Cut Structural	22.00
Elec. Furnace Bundles	23.00

Cast Iron Grades

No. 1 Cupola Cast	20.00-22.00
Heavy Breakable Cast	17.00
Stove Plate	17.00
Unstripped Motor Blocks	17.00
Malleable	20.00
Brake Shoes	17.00-18.00
Clean Auto Cast	23.00
No. 1 Wheels	22.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	17.00
Railroad Malleable	22.00
Rails, Random Lengths	17.00
Angles and Splice Bars	17.00

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	12.00
Mixed Borings, Turnings	12.00
Punchings & Plate Scrap	24.00
Electric Furnace Bundles	26.00

Cast Iron Grades

No. 1 Cupola Cast	28.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Rerolling	25.00

HAMILTON, ONT.

(Delivered prices)

Heavy Melt.	$20.00
No. 1 Bundles	20.00
Mechanical Bundles	18.00
Mixed Steel Scrap	16.00
Mixed Borings, Turnings	14.00
Rails, Remelting	20.00
Rails, Rerolling	23.00
Busheling	14.00
Bushelings new factory, prep'd	18.00
Bushelings new factory, unprep'd	13.00
Short Steel Turnings	14.00

Cast Iron Grades*

Cast	33.00-35.00

* Removed from price control Aug. 9, 1947; quoted on basis of f.o.b. shipping point.

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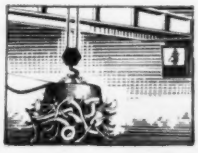

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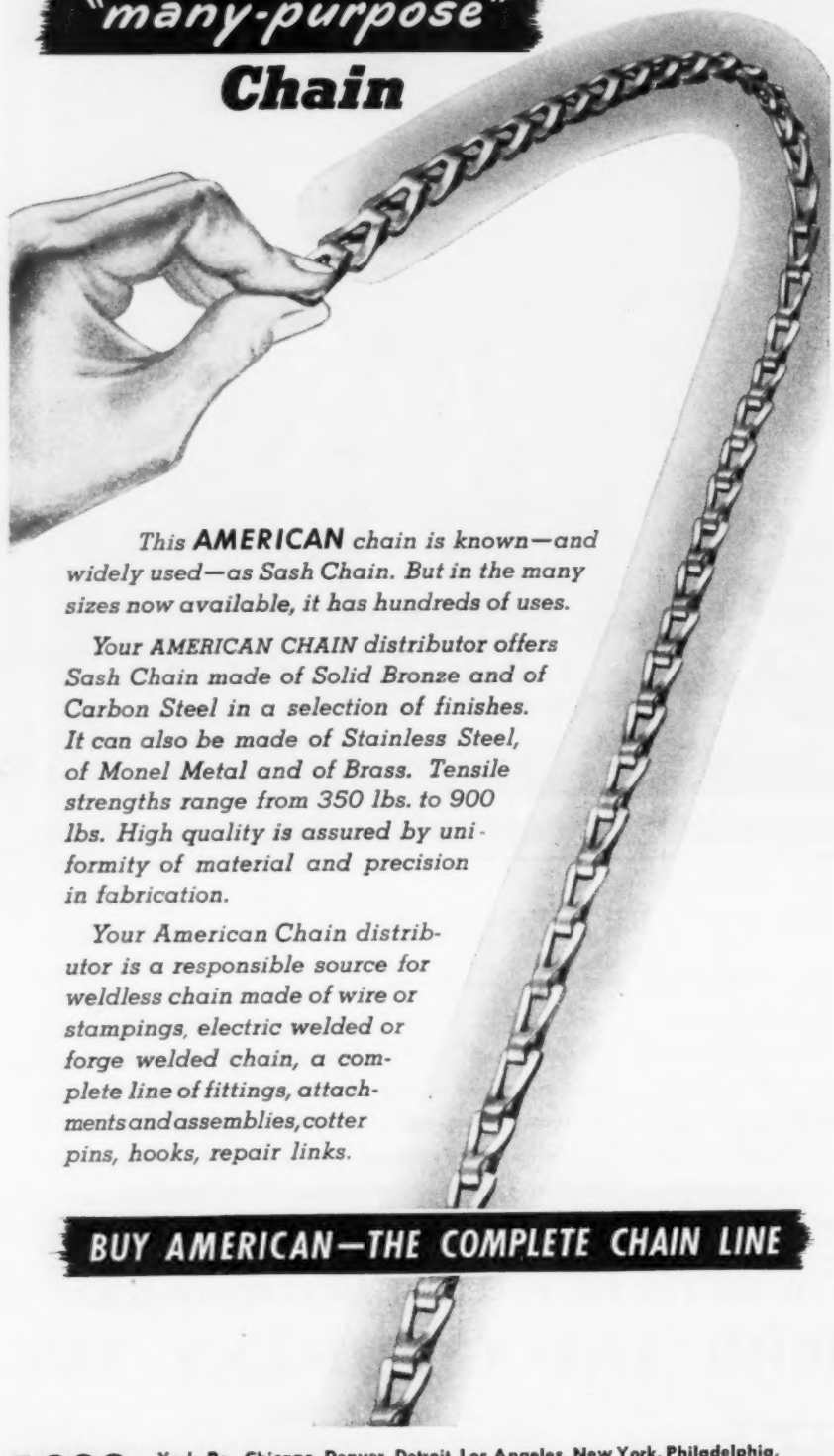

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Tubular Goods . . .

J. & L. revises pipe and oil well tubing prices to competitive levels

Tubular Goods Prices, Page 131

Pittsburgh — Jones & Laughlin Steel Corp. revised prices Sept. 12 on pipe and oil well tubing. A substantial reduction in prices to competitive levels, ranging up to $22 a ton for 2-in., was announced on black and galvanized standard pipe, ream and drifted, and on extra strong seamless steel pipe. The adjustments are concentrated within the 2 to 4-in. size bracket.

Seamless line pipe, black and galvanized, also was similarly reduced to competitive levels, within the same size range.

Lap weld steel and line pipe, discounts were reduced one point, or $2 higher price, in sizes 3½-in. and 4-in. Oil well tubing was reduced $1 per ton.

Chicago—While it is too early to say with positiveness whether the upward trend in tubular products' sales will continue, mill men are hopeful that the upswing registered in August and apparently continuing in September will mean a more realistic ordering pattern by consumers. Buying is dictated now by immediate needs and to the most exacting specifications with orders going generally to the producer who can promise quickest delivery. Keeping inventories low and buying only against orders in hand could cause shortages, if production in some plants were to suddenly gain as little as 2 per cent. Failure to appreciate the difficulties incident to tube production is one of the biggest faults found against purchasing agents by producers. While a very reasonable lead time can now be given on all orders, buyers want an order filled practically on the spot.

Los Angeles—With the exception of galvanized sheet, pipe currently is probably in strongest demand of all steel products. One pipe mill is booked solidly through the fourth quarter, and, although it has not yet opened 1950 books, this producer could quickly write orders for virtually the entire first quarter of next year. Principal sources of pipe demand are residential construction, industrial projects, and public works. Requirements of the petroleum industry are limited, with the larger producers generally spending less for new equipment and facilities than they did in 1948. A leading constructor of steel service stations for western oil firms, although far more active than it was in prewar days, nevertheless booked 25 per cent less business in the last three months than during the same period a year ago.

Tin Plate . . .

Tin Plate Prices, Page 130

Pittsburgh—Fourth-quarter tin mill product production schedules are more promising than previously indicated. Sellers find it less difficult to move "excess" tonnage, while customers' inventories are in closer rela-

tionship to actual requirements than earlier anticipated because of large tonnage releases from mill stocks early in July through mid-September due to the strike threat. Third-quarter tin plate output likely will compare favorably with practical capacity pace recorded in the like 1948 period. October production schedules are fairly well filled and, although demand should decline seasonally, sellers are more optimistic in regard to operations schedules over the remaining months of this year.

Wire . . .

Wire Prices, Pages 130, 131

Boston—While much of the increase in wire buying may be for rebuilding of inventory, demand includes a broader range of products for moderately improved consumption. Orders and releases are appearing for some specialties which had been slow for months. High-carbon wire schedules for October are well rounded out while specialties requiring longer processing are more extended into fourth quarter. Shipment on music wire is prompt and from stock on more sizes. Deferments on valve spring and other automotive specialties have not appeared although volume going to assembly plants is ahead of their high rate of consumption. Some slackening in releases from this industry is expected next quarter.

Bids on wire mesh fence, 4700 sq ft, bridge, Maine, ranged from 30.00c to 52.00c.

New York—Wire orders include more fourth-quarter tonnage and cover broader range of products; while there are some openings in October schedules, gaps are spotty and filling. Demand is heavier for mattress and upholstery spring wire, armored cable wire, and steel telephone wire, the latter for the government. Lift in orders indicates many industrial consumers have reached point where inventories require replenishment. Releases against deferred committments are increasing, some from cold heading consumers.

Chicago—Disposiiton of consumers to buy farther ahead and to buy more than is immediately needed has dispelled much of the pessimism of wire producers. Certain industries are upping their requirements; recent sales experience of furniture makers, for example, shows that previous production estimates were too low. Merchant wire items are also in greater demand and jobbers are experiencing a good volume of sales of fencing. At the present time, producers state there is no shortage of nails, fencing or barbed wire.

Birmingham—Wire demand which shows periodic weakness, is strong now. Manufacturers' wire, wire fencing, and nails continue to move in substantial volume. Production is geared closely to needs, precluding much stocking. Jobbers have improved their stock position on most wire products.

San Francisco—Demand from fabricators of bed and spring manufacturers remains strong, keeping output of spring wire here at a high level.

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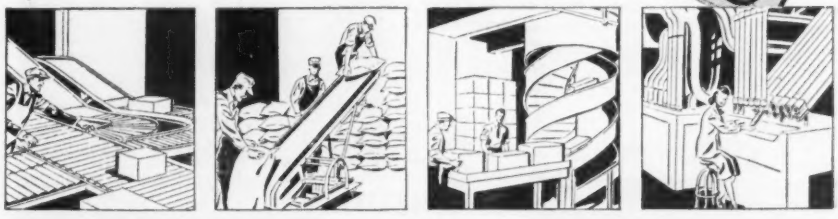

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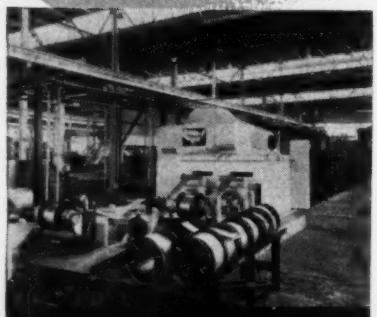

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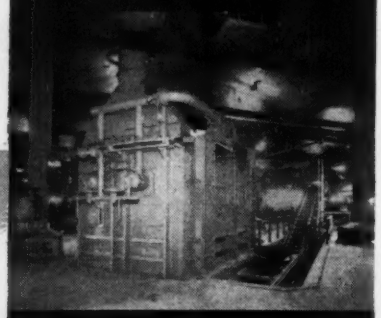

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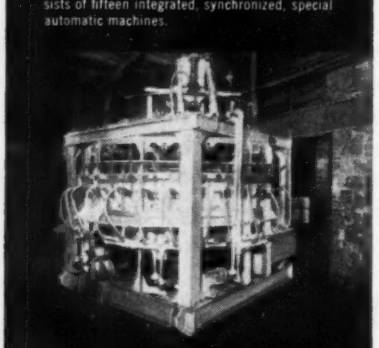

Continental Special Automatic Glazing Machine complete with automatic press synchronizer and fire polisher.

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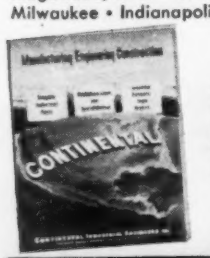

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Sheets, Strip . . .

Sheet Prices, Pages 129, 130

New York—Sheet buying is brisk, especially in cold-rolled and coated sheets. Practically all sellers are sold well into November on cold-rolled, in some instances beyond. Offerings of galvanized sheets run into December, although late November is still being quoted on the heavier gages.

Some midwestern mills report heavier inquiry here than at any time in recent months, ascribing this fact largely to the sold-up condition of eastern mills. There is a fairly good demand for hot-rolled sheets, but tonnage still can be picked up for delivery within four weeks. Specialties, such as stainless and electrical sheets, also are in easy supply, although stainless is in better demand, especially for restaurant equipment and trim for commercial buildings. Such latter requirements are as heavy as at any time this year.

Boston—Distribution of new orders for cold-rolled sheets and galvanized cover a wider range due to relatively sold-up position of one leading eastern mill, now through November on most grades and sizes. Consumers requiring tonnage within six to ten weeks are turning to other sellers, paying higher freight costs. Outlook for fourth quarter with larger users of sheets, including enamelling stock and electrical, is improved. In numerous instances inventories are lower and steel demand is more sensitive to moderate improvement in end-use products. Cold strip is sharing in the upward trend, but mills are operating well below finishing capacity as a rule.

Philadelphia — Stringency continues in cold and galvanized sheets. Fourth-quarter capacity appears to be largely taken up on both items, with some producers not only allocating coated sheets, as they have been doing for some time, but also cold-rolled.

Sold-up condition of eastern mills is putting greater pressure here on Pittsburgh and mid-western mills for tonnage in these grades; as tonnage brought in from these mills involves extra freight costs, many consumers are insisting on truck rather than rail shipments when possible as they are the cheaper. The carload rail rate from Pittsburgh to Philadelphia is 54 cents per 100 lb against 41 cents by truck.

Hot-rolled sheets are being offered for delivery in four to six weeks, the greater portion at nearer the inside figure. Stainless sheets are in better demand, but deliveries continue easy.

Pittsburgh — Demand for galvanized and cold-rolled sheets continues to exceed current production schedules with the result sellers are still rationing output among various district offices. Well sustained demand from automotive industries and for government storage bins are major factors in this connection. A moderate upturn in metalworking operations among miscellaneous consumer outlets is also an important factor in the generally improved sheet and strip order backlog situation. An undeterminable portion of the increased buying is attributed to protective strike coverage and is expected to

result in a moderate reduction in orders for November and December delivery. Consumers' inventories generally are not excessive, and some are below safe levels.

Cincinnati — District sheet mill schedules are fairly well filled to mid-fourth quarter on steady demand marked by high rate of shipments to automotive industry and revival of buying by household appliance manufacturers. Some buying has been as a hedge against labor trouble, but insistence on early delivery in many instances points to production requirements. Cold-rolled remains tight, and galvanized output falls short of needs. Hot-rolled supply is in balance with demand.

Chicago — Inventories of certain flat-rolled products, cold-rolled and galvanized sheets in particular, are dangerously low and would have been exhausted in about two weeks had supplies been shut off by a strike. Many purchasing men have been trying to build about six weeks' supply but deliveries currently are running about four weeks behind promises. This situation generally does not apply to automotive parts suppliers, their stocks averaging in the neighborhood of 45-60 days. Many consumers are most heavily overstocked on hot-rolled sheets and an inventory reduction campaign is being stepped up. Some household appliance makers' order backlogs are rapidly climbing and many have taken full steel tonnage allotments through fourth quarter. Enameling stock threatens to be a bottleneck with some companies. Pick up in appliance manufacture is spurring sales of electrical sheets although this material is readily available with normal lead time.

Birmingham—Sheets and strip are the most wanted items in this district. Galvanized sheets are in particularly strong demand with little being available for the balance of the year. Some strip production is noted, but most shipments are from earlier schedules.

Los Angeles—Stringency of sheet supplies is still apparent in many quarters, although the situation has not become any tighter in the last several weeks. The notable exception is galvanized, which in lighter gages remains in extremely short supply. Producers of flat-rolled items generally have not yet opened their books for first quarter of 1950. Predictions of supply-demand conditions that may prevail next year are mixed. Cautious optimism, however, is the general rule.

San Francisco—Demand for flat-rolled products has been heavy of late, depleted inventories and improved business of consumers accelerating buying. Major producer is booked more than three months ahead on hot-rolled sheets. Galvanized sheets are especially tight.

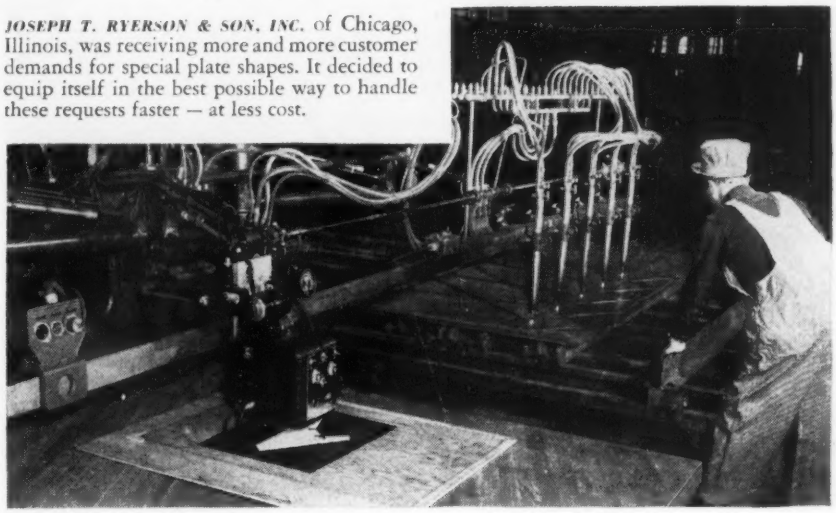
Steel Bars . . .

Bar Prices, Page 129

New York—While it is too early to judge the effects of developments in the steel wage dispute, hot carbon bar demand is well sustained at the improved level of last month. Deliveries are becoming slightly more extended, but can be had within four

steel warehouse meets growing demand for special order plate shapes with electronic eye guided machine gas cutting

JOSEPH T. RYERSON & SON, INC. of Chicago, Illinois, was receiving more and more customer demands for special plate shapes. It decided to equip itself in the best possible way to handle these requests faster — at less cost.



A. H. Yoch and J. F. Franzen, Airco Technical Representatives, were called in, and recommended machine gas cutting with Airco's new No. 41 Travograph, equipped with Airco's famous "electronic eye" tracing device. Ryerson has since put eleven of these new machines to work in its various warehouses throughout the country.

After installation, Ryerson soon confirmed that this equipment produced more intricate shapes on a production basis than any other type of cutting equipment — the "eye" following a sketch with a high degree of accuracy. Further, expensive template making was eliminated entirely.

Today, the variety of steel shapes flame cut by Ryerson is almost endless — for example, a few of the parts and pieces include: circles, rings, wrenches, flanges, weldment parts, crankshafts, clamps, housings, cams, machine parts, and die parts . . . highly profitable business for the "little iron store" that grew into one of the world's largest steel warehousing firms.

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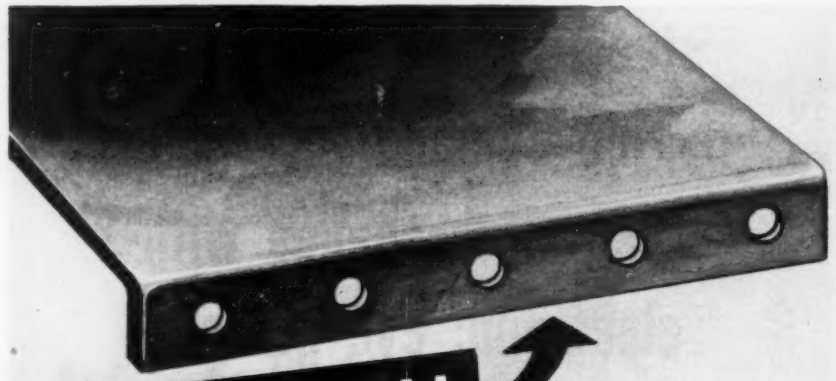
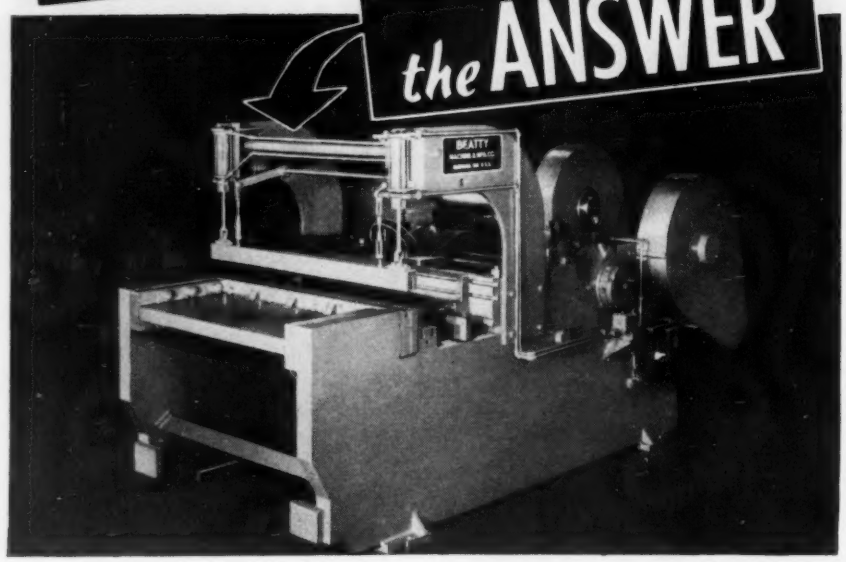


the PROBLEM

Punching a long line of holes horizontally through a vertical flange after forming.

the ANSWER



NEW HORIZONTAL MULTIPLE PUNCH
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This new Horizontal Multiple Punch, one of the first of its type, is typical of how practical, but imaginative engineering can solve problems. Designed for a railway shop, the new machine punches a series of holes horizontally through a vertical flange, providing for faster, lower cost production, and a more accurate fabrication. An air clamp device holds the material down during the punching operation for gauging purposes. Stripping is accomplished by air cylinders which travel with the ram. If you have a production problem, let a Beatty engineer work with you on it.

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to five weeks. One leading eastern seller can offer about any size or form for delivery in October. Cold-drawn carbon bar supply is easy. Alloy bars are reported by some sellers in a little better demand, but by others as showing no improvement.

Philadelphia—While hot carbon bar supply is generally tighter than a month ago, some leading sellers can still promise three to four weeks on most of the popular sizes. Demand is spotty and reflects particularly the absence of important buying by the railroads. Cold-drawn carbon bars can be had for prompt delivery in many instances and the general run of alloy bars can be had within two to three weeks.

Chicago—Production of steel bars was seriously curtailed here last week by a walkout at Carnegie-Illinois' Gary Works. Walkout of 50 billet yard crewmen idled 3100 workers in 12 merchant mills. No cause for the walkout was given. Meanwhile, other district mills report a continuing good business in hot carbon bars, quotas being taken in full on a monthly basis in many sizes.

Operations resumed in the affected mills Wednesday afternoon when an end to the walkout was voted at a union meeting. It is estimated 19,000 tons of finished steel was lost.

San Francisco—Not much pick-up is noted in hot-carbon bar demand. Supplies are ample for current needs and no tendency has been shown toward future buying.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 129

Boston—Demand for concrete reinforcing bars hold relatively high with supply for fabricating in better balance. Public works, bridges and housing, account for the bulk of requirements. Close to 500 tons have been bought for bridges. Most contractors quoting on bridge tonnage bid 8.50c to 9.00c on deformed steel bars in place.

Chicago—New industrial construction as well as increased number of public works projects are lending support to a new optimism among fabricators. Shops of important local interests are well filled with work and, while some find small jobs making up the bulk of their activity, there is sufficient to sustain operations for some time. Bar supply is generally not a great deterrent to increasing production, plant size and working force setting the limitations in some instances. More contractors than fabricators are concerned about where the next job is coming from, and bidding has been known to shave the profit margin too thin in some instances.

Los Angeles—Demand for reinforcing bars continues strong, and producers are optimistic as to continuation of activity at a high rate. One fabricator, which keeps three estimators in the field, has more requests for bids than it can handle.

Seattle—Rolling mills report a fair volume of reinforcing business, much of it in tonnages of less than 100 each. General construction is fairly active and public works are absorbing much reinforcing. Backlogs are fair, but are declining.

Plates . . .

Plate Prices, Page 129

New York—Specifications for light gages of plates are showing further gain, due primarily to pressure from fabricators of fuel oil tanks and heating equipment. These requirements are outstanding compared with other lines. Ship work is spotty, railroad requirments show no improvement and, so far, there is little increase in demand from fabricators of pressure vessels. Building needs show a little improvement, but important buying for heavy gas and oil construction still is lacking.

Boston — Plate deliveries range from a few days to November. Orders are up slightly, notably to cover miscellaneous industrial demand including tank work. Bulk of buying is for prompt shipment and more small volume mill tonnage is being shipped into this district by truck. Shipyard requirements are maintained, but are met without difficulty. Except for weldments, demand leans strongly toward light plates.

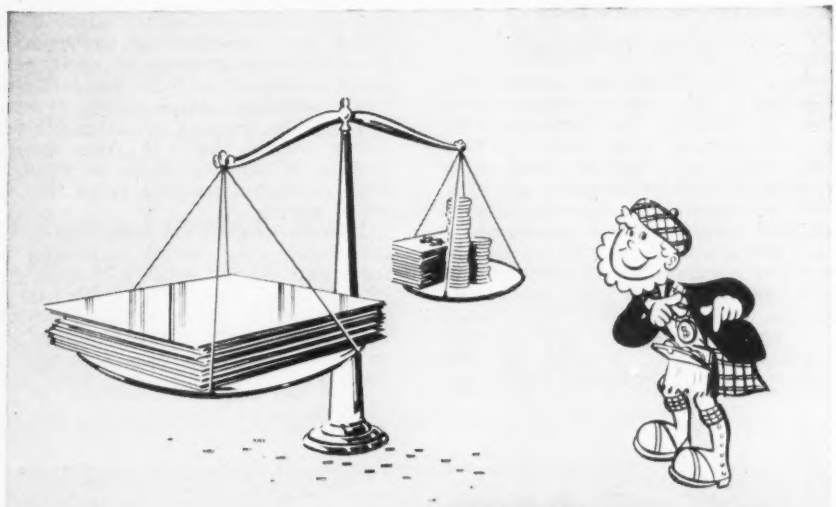
Philadelphia—Plate demand is spotty with little improvement in early prospect. Business is being sustained largely by releases from the smaller tank shops for replenishment of stocks. Specifications also are being bolstered somewhat by seasonal demand for light fuel oil tanks and heating equipment, but even this is leveling off a bit.

Export demand has given some mills a little boost, but has dropped off again, with foreign prospects not encouraging because of the dollar shortage. One district mill with rush tonnage for shipment abroad stepped up operations to virtual capacity for a short time recently, but last week upon completion of the work dropped ingot production about 50 per cent. Operations at other district mills, while not fluctuating as sharply, are on a restricted basis. Operations generally are better than they were in July, but off from a couple of weeks or so ago. Deliveries range from two to four weeks.

Chicago—While not classifiable as a scarcity item in the same sense as cold-rolled sheets are, stocks of carbon plates at some large consumers' plants have been allowed to decline below those of other steel products. On the basis of this, an increase in ordering is indicated, barring further reductions in requirements of some normally large plate consuming groups, notably railroads. More tank work has been placed with local fabricators to extend some of their order backlogs over the rest of the year. Makers of oil tanks for domestic use are currently operating at high levels.

Birmingham—Plates are in strong demand, particularly light gages, with the need covering a diversity of uses. It is not probable there will be any surplus so long as the bulk of the section's requirements are left to the Fairfield mill to supply. Deliveries are moderately easy.

Seattle—Plate fabricators have received no contracts for grain storage bins which were recently awarded to various plants elsewhere. Some local firms bid on subcontracts on this project. Small plate shops are short of jobs while the larger fabricators are in keen competition for new business.



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Weight of One Sheet of MicroRold .0475 36 x 120 Plus or Minus 3%	.0475"—59.85 Pounds Theoretical Weight 59.85 Pounds	

Average saving in theoretical weight 3.15 Pounds per sheet—or 5%.

Remember, this saving is expressed in pounds per single sheet. Multiply your saving by the number of sheets you use per month and the price per pound. You'll have a strong dollars and cents reason for specifying MicroRold stainless steel every time.

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Structural Shapes . . .

Structural Shape Prices, Page 129

New York—Structural activity has reached a point where some fabricators are finding production and incoming tonnage near balance. Certain shops are experiencing little shrinkage in order backlogs and actually anticipate an early increase in unfilled tonnage. This may come before the end of the month, as general demand is expanding. This expansion may continue for at least another six weeks or so, although there likely will be easing as the cold weather nears, especially because a substantial portion comprises bridge and road work.

A number of small fabricating shops are experiencing particularly good business as result of small projects, averaging 40 to 50 tons. Meanwhile, standard shape supply is adequate, with sections available for delivery within three to four weeks. Supply of wide sections is tighter, with deliveries ranging from five to seven weeks.

Boston—Higher volume ratio of structural steel being estimated is for public works, notably bridges, including first spans needed for Olneyville cutoff, Providence, R. I., closing Sept. 28, contract 1. New inquiry also involves a 425-ton steel superstructure, Vermont, Sept. 23. Fair volume of small tonnage contracts is taken by district shops, but with backlogs on decline. Low unit quotation on structural steel, Waterbury, Conn., viaduct, 1135 tons, was 11.70c per pound by second lowest bidder. For a three-span composite deck bridge, 110 tons, also Waterbury, three lowest contractors all quoted 9.00c per pound on structural steel.

Philadelphia—While a fairly good amount of work is being figured, chiefly public work, structural orders are scattered and in general backlogs at fabricating shops continue to decline. The larger shops still have a substantial volume of tonnage on hand—four months and over in some instances. They expect to maintain a good rate of operations, although anticipate a reduction in new business, until cold weather restricts the amount of bridge work.

Chicago — Fabricators generally are unable to add substantially to their order backlogs, since many new contracts go to those who are able to offer promptest delivery. Those working off old contracts generally are occupied at capacity and, while interested in new business, do not solicit it too actively. The much improved supply situation in shapes of a few months ago lulled some users into a false sense of inventory security and a check here reveals that a strike would have caught some short of supply.

San Francisco—Buying continues dull with private contracting relatively inactive. Judson Pacific-Murphy Corp. booked a $554,500 contract for bridge superstructure near Rio Vista, Calif. Mortensen Construction Co. has a $5198 structural steel subcontract for a college library in San Francisco.

Seattle—Demand is slow and fabricators anticipate increased competition in seeking new business. Backlogs are down and the situation is not too promising. Considerable tonnage is in small contracts for schools and commercial building.

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Pig Iron . . .

Pig Iron Prices, Page 128

Pittsburgh—Basic pig iron output was reduced sharply here early last week as a result of precautionary measures taken in event of a railroad strike at five plants of U. S. Steel Corp. By mid-week, normal operations had been resumed, following agreement of railroad officials not to strike pending further negotiations of the issues in dispute. Carnegie blew in an additional furnace last week in an effort to make the company less dependent on scrap by increasing its hot metal charge. Foundry activity has recorded little change in contrast with the upturn in castings demand noted in other districts. A slight increase in orders is reported by jobbing interests and those foundries serving radiation and enamelware industries. However, one large interest furnishing castings for electrical appliances has failed to realize the anticipated upturn in order volume, while railroad and mine car interests are operating only two to three days per week.

New York—Pig iron sellers look for some gain in specifications this month, but they will not be surprised

if a tendency to level off develops. There undoubtedly was some protective buying last month and, with indications pointing to the steel controversy being adjusted without a general strike consumers may specify less freely for a while. District foundry melt should not reflect any leveling off, as orders for castings are more active than a month ago and weather favors better operation.

Boston — Shipments are slightly heavier, including scattered releases against old orders. Excepting those in Connecticut, New England foundries are operating around 40 per cent capacity, about 10 per cent higher than second quarter low. Some are below this average, one supplying paper mill equipment pouring on only one day per week on light castings.

Cleveland—Foundries did considerable protective buying of pig iron before the Sept. 15 deadline for a threatened steelworkers' strike and with the deadline extended to Sept. 25 and labor negotiations still unsettled there was belief that protective buying was continuing. Producers of merchant iron were still receiving a fair volume of orders on the 15th.

Contributing to an upturn in demand for merchant iron has been improved demand for castings and a scrap price uptrend which has influenced an increase in the percentage of iron used in melts. Pressure on foundries for lower prices on castings is reported to have evaporated.

Buffalo—A pronounced improvement in demand for merchant iron is believed due to more than buying in anticipation of the steel strike. Shipments during the last two weeks are among the best of the year. One of the leading producers is no longer piling any iron, although some iron is still moving into storage depots. Indications, however, point to a further rise in operations.

Birmingham — Pig iron demand continues strong after a rather spectacular revival. Not all comers are being immediately supplied, although there is no long waiting and tonnage is moving methodically. Foundry operations have stepped up while scrap prices have increased to contribute to the revival.

St. Louis—Pig iron demand continues to gain, although steel foundry orders are slow. Producers entered September with orders about 10 per cent above expectations with the upturn continuing through the first two weeks. Koppers expects to put its second furnace on in October, if demand keeps the present pace. Its stocks are ample for September. Strike on the Missouri-Pacific Railroad has slowed up iron deliveries.

Rails, Cars . . .

Track Material Prices, Page 131

New York—Car buying lags with little improvement in prospect. Last month, the American Railway Car Institute reports, freight car orders totaled 185 units compared with 408 in July, all with commercial shops. Total for the first eight months was 3569.

Deliveries in August totaled 7178 cars, against 6434 in July. Backlogs Sept. 1 were 28,731 against 36,564 Aug. 1, and 177,815 a year ago. Of orders on hand 14,539 cars are in company shops and 14,192 in railroad shops.

August deliveries comprised 4245 cars from commercial shops and 2933 from railroad shops.

Bethlehem Expands in West

Los Angeles—Construction of a 16,000 square-foot addition to its bolt and nut plant is the latest step in the postwar expansion program of Bethlehem Pacific Coast Steel Corp.'s local mill.

R. J. Tremblay, general superintendent, believes its complete expansion program will make this steel plant the largest steelmaking facility, exclusive of those producing from iron ore, on the West Coast. Next year the mill will produce at the rate of 350,000 net tons of ingots annually.

Already completed are new soaking pits, a blooming mill, a new 10-inch high-speed bar and rod mill, and a wire mill. Being installed is a 75-ton electric furnace which will triple the plant's wartime capacity.

The facilities being added to the bolt and nut plant will be in production Jan. 1. They include cold-heading and cold-forming equipment, together with a new galvanizing line.

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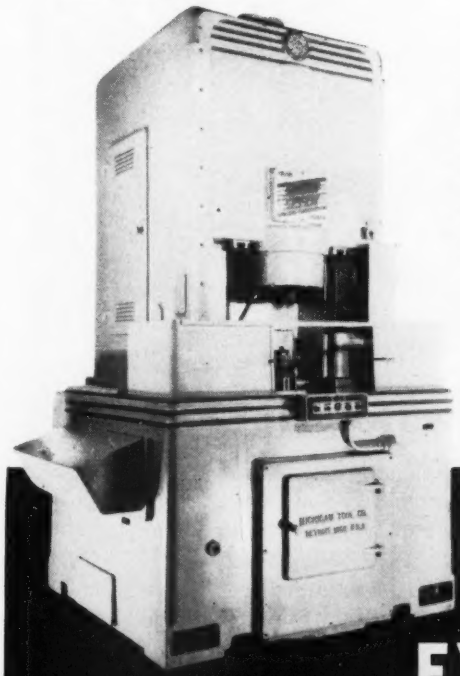

FREE — For explanatory details and illustrations that show why more and more hydraulic equipment manufacturers are standardizing on "BCF" Standardized Exchangers, write for Bulletin 1.1K1. Ross Heater & Mfg. Co., Inc., Div. of American Radiator & Standard Sanitary Corp., 1431 West Ave., Buffalo 13, N. Y. In Canada, Horton Steel Works, Ltd., Fort Erie, Ont.

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Scrap . . .

Scrap Prices, Page 136

Pittsburgh—Small lot mill purchase of No. 1 heavy melting steel at $30 developed last week, an increase of $3 over last reported sale. Other open-hearth grades also sold at comparably higher price levels. Mills generally continue out of market for large tonnage broker-dealer scrap commitments—but have been able to pick up small lots at above quotations. As price spread between that of pig iron and scrap narrows, integrated mills expect to return idle blast furnaces to active list to increase hot metal change thus reducing dependence on scrap. Two interests in this district already initiated this program. One drawback is that such policy will result in heavier drain on coal inventories at time when mine operations are limited and there is prospect of cessation of mining operations later this year. Continued upturn in scrap quotations is indicated with prospect of uninterrupted steel mill operations and because of fairly well sustained new order volume throughout industry. Advance in quotations for machine shop and mixed borings and turnings of $1 is reported paid by "crushers" on expectation further advance in short shoveling turnings over next 30 days. Additional strength also is noted in cast scrap with sale on No. 1 machinery within range of $38-$39; mixed at $34-$35. Railroad scrap items remain nominal at recent price levels awarded to brokers because no tonnage on recent lists went to Pittsburgh mills.

Philadelphia—Undertone in scrap continues strong. While no mill orders for melting steel scrap were reported last week, brokers are now having to pay as much for tonnage as they sold it for a short time ago; some brokers actually are offering more. Consequently, the market on No. 1 heavy melting steel is nominally $24-$25, delivered; No. 2 heavy melting and No. 1 busheling, $22.50-$23.50; No. 1 bundles, $24-$25; No. 2 bundles, $21.50-$22.

On light consumer buying, machine shop turnings are $16-$17; mixed borings and turnings, $16.

Bar crop and plate and punchings and plate scrap are higher at $25.50-$26.50; and cut structurals at $24.50-$25.50, with still higher prices indicated. Electric furnace bundles are slightly higher at $24.00-$24.50. No. 1 chemical borings are up more than $1.50 on an average, now holding at $21-$22.

Cast grade prices continue to increase with No. 1 cupola now $35-$36; No. 1 machinery, $38; charging box and heavy breakable, $33.00-$34.00; clean auto cast, $38. Some small lots of malleable have been sold at $36-$37.

Strong upturn in steel scrap prices is again arousing interest in foreign scrap. No further buying has been reported, but some of the larger consumers are definitely interested in what might be done pricewise on bringing in additional steel from Europe. Old contracts for European scrap have virtually run their course and to make new buying attractive prices would have to be well under the $40 or so delivered seaboard

prices which ruled on original contracts for German scrap.

Chicago—Much of the scrap going into consumption at the present time has been obtained directly from industries and railroads, transactions to a great extent bypassing the dealers. A few mills have openly stated their policy to take no dealer material, while others have bought only limited tonnages. Brokers' activity is extremely lively and, on the basis of what consumers would have to pay for major grades, prices are up $2 to $3 on many items, the latter figure applying to many railroad items in which interest has been strongest. No. 1 heavy melting steel and No. 1 bundles rose to $26-$27, the top figure being low in the opinion of many traders if sizable tonnages were involved. Chicago interests are said to be playing an important role in the bidding on industrial and railroad scrap in other districts and a substantial quantity of this material will come into this district to satisfy anticipated needs.

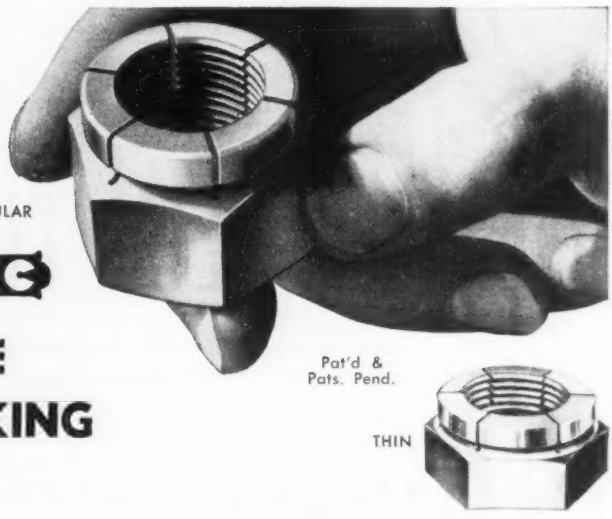
Buffalo—Sales of any consequence are still hard to find in the scrap market, but price strength was sustained last week despite the threat of labor trouble in the industry. Dealers now expect sales may develop within a range of $26-$27 for No. 2 heavy melting and related items. Business is taking place in the cast market with no easement in prices. Mixed yard cast is moving at $35-$35.50, while higher quality material is priced up to $37.50.

Cleveland—On strength of a sale of No. 1 heavy melting steel scrap in the Valley at $30 a ton, offering prices on other grades there and on all grades at Cleveland rose last week. Also adding an inflationary touch to prices are recently reported sales of railroad scrap. Mills continue to avoid making large purchases on the open market; quoted prices largely represent brokers' offering prices. As long as there is a threat of a steelworkers' strike, it is not likely mills will be inclined to buy. A peculiarity of the current price situation is that scrap prices fell and then rose to the present levels even though there has been very little buying. With prics on the upgrade, dealers have been reluctant to sell to brokers. As a result of higher quotations on steelmaking grades and an improvement in foundry operations, prices on cast grades of scrap moved up further last week.

Cincinnati—Some mill buying has appeared in the scrap market, helping to build up a stronger undertone. Prices are higher on test from sales and on reflection of increases in other districts. Borings and turnings, and No. 2 bundles are in light demand. Foundry purchases are rather light, and spotty.

Birmingham—Scrap market continues strong with a pronounced tendency toward higher prices, although there is no agreement on such procedure. Heavy melting is posted at $22, stimulating activity of truckers.

St. Louis—Scrap prices rose slightly last week under mill pressure for railroad material. Foundries also are buying railroad scrap and brokers are bidding it up to cover old orders. With rail offerings low and country dealers holding out for better prices,



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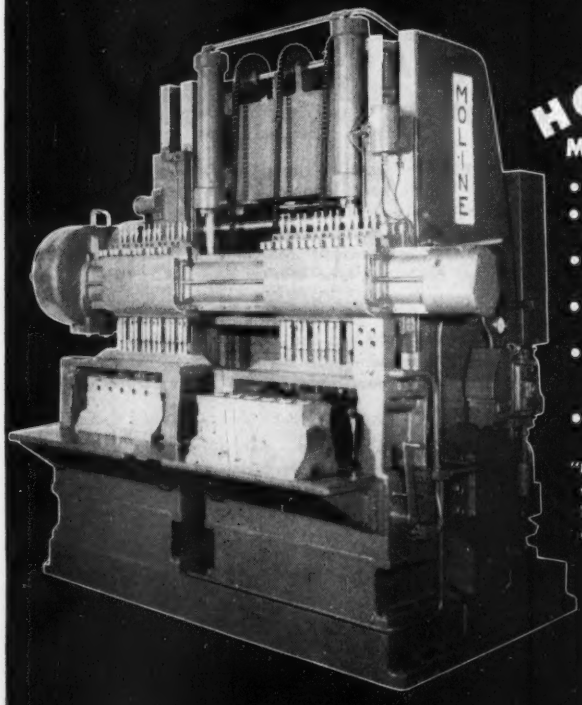

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the general tendency is upward although little buying is in evidence.

Los Angeles—Dealers are hopeful of a price increase in steelmaking scrap, but as yet it has not materialized. Stock piles in collection yards are larger than they have been for some time, but despite the fact mills are showing interest in larger tonnages of scrap, dealers are reluctant to make increased deliveries at current price levels. Foundry operations have improved, strengthening undertone for No. 1 cupola cast.

San Francisco — Ingot production of one major producer lately has been at the best level in two months, but output of the second largest interest continues to lag. As a result, the pickup in scrap demand has been limited with buying largely for stock replenishment. Prices are unchanged.

Seattle—Mills' inventories of scrap are sufficient to carry them until the labor situation is clarified. The market is firm at $16 for Nos. 1 and 2 heavy melting. Cast iron scrap is inactive as the majority of buying interests have temporarily withdrawn from the market. The price is unchanged at $20-$22.

Warehouse . . .

Warehouse Prices, Page 132

Boston — General line warehouse distributor sales of hot-rolled products are heavier; those of cold finished are slow. Flat-rolled volume is slack with return of former competition weakening price structures. Some sheet tonnages are moving near mill prices with secondary sellers absorbing part of freight costs and shading listed prices. Cold-drawn bar stocks are heavy with some, and also show price weakness.

Pittsburgh — Warehouse steel stocks are excessive in such products as stainless, alloy bars and some sizes of plain hot-rolled sheets and strip, despite the cautious buying policy followed for some time. Wide-flange beams, galvanized and cold-rolled sheets are the only items in which stocks are inadequate to meet present demands. The slight upturn in August warehouse shipments has leveled off. Size of warehouse steel orders in recent weeks indicates customer orders have been for actual needs, despite the industry-wide strike threat. Distributors have not increased charges for city delivery to 20 cents, as initiated in Chicago.

Philadelphia—Warehouse prices generally have not as yet reflected the latest increase in freight rates although some jobbers have advanced prices on cold-drawn bars about two cents a pound because of the higher rates. Consequently, the local warehouse market on cold drawn rounds is holding at 6.09-6.11c base for city delivery and 5.94-5.96c for country.

Cleveland—Warehouse business here is reported off 20 per cent or more from the level at this time last year and some of the newcomers are quoting reduced prices to move material. One of the new warehouses is being advertised for sale. Maintenance work is accounting for a substantial amount of business for warehouses. Among products moving well are structurals and roofing and siding materials.

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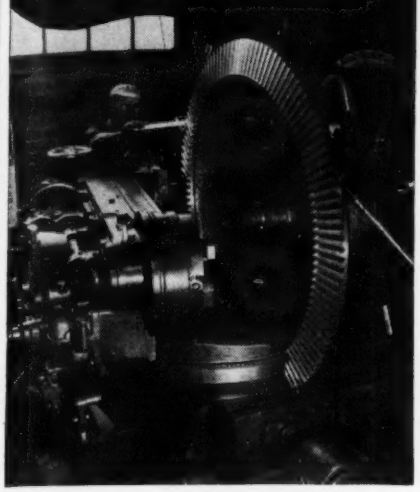

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Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 000

Pittsburgh—Outlook for fastener items throughout the final quarter is not too promising because of relatively heavy customer releases throughout August and to date this month against forward commitments. Considerable tonnage previously scheduled for September delivery was shipped in August, while shipments this month have been largely at the expense of October bookings. Producers have increased production schedules slightly, although most are operating only one shift on a 40-hour per week schedule. Fastener interests here have steel inventories ranging from 60 to 70 days at current operating levels.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

413 tons, sheet piling, power station, Dairyland Power Corp., Cassville, Wis., through F. H. McGraw & Co., to Carnegie-Illinois.

410 tons, power house, Whiting, Ind., Carbide & Carbon Chemical Corp., to American Bridge Co.

360 tons, Du Pont nylon plant, Seaford, Del., to Bethlehem Fabricators Inc., Bethlehem, Pa.

300 tons, state bridge, Perry, Juanita and Snyder counties, Pennsylvania, to American Bridge Co., Pittsburgh.

200 tons, state bridge, Caroline county, Maryland, to Phoenix Bridge Co., Phoenixville, Pa.

150 tons, School of the Holy Cross, Springfield, Pa., to Morris-Wheeler & Co., Philadelphia.

110 tons, bearing piles, grade separation, Sec. 066-0303.4, Chicago, through Arcole Midwest Corp. to Carnegie-Illinois Steel Corp.

STRUCTURAL STEEL PENDING

2900 tons, Veterans Administration general hospital, Chicago; J. L. Simmons Co. Inc., that city, apparent low bidder.

2500 tons, state bridge, Lycoming county, Pennsylvania; George Vang Inc., Pittsburgh, low on general contract.

1135 tons, viaduct and approaches, Waterbury Expressway, Waterbury, Conn.; Munroe & Langstroth, North Attleboro, Mass., low on general contract; work also takes 150 tons, deformed steel bars and 125 tons, steel piles.

425 tons, bridge, steel superstructure, Vermont Route 15, near Fletcher, Vt.; bids Sept. 23, Montpelier; contract also includes 77 tons, reinforcing steel bars.

325 tons, Washington state—King county girder bridge; bids to Olympia Sept. 23.

315 tons, 300-foot twin span reinforced concrete slab bridge on welded steel girders, Quinebaug river, Canterbury - Plainfield, Conn.; bids Sept. 19, Hartford.

200 tons, Washington state, Methow river, Okanogan county, truss span; bids to Olympia, Sept. 23.

130 tons, state bridge work, Adams county, Pennsylvania; Donald B. Stabler, Harrisburg, Pa., low on general contract.

110 tons, South Leonard street bridge, Naugatuck river, Waterbury, Conn.; Della Bitta-Bassola Inc., Plantville, Conn., low on general contract.

Unstated, baseball stadium and office, 18,000 seating capacity; bids to Portland, Oreg., Baseball Co., Sept. 22.

REINFORCING BARS . . .

REINFORCING BARS PLACED

290 tons, Institute of Pathology building, University of Tennessee, Memphis, to Laclede Steel Co., St. Louis; Foster-Creighton Co., Nashville, Tenn., general contractors.

250 tons, reservoir, Electromotive Division, General Motors Corp., LaGrange, Ill., to

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Joseph T. Ryerson & Son Inc., Chicago.

250 tons, addition, building 3, Veterans Hospital, Tuckegee, Ala., to Virginia Steel Co., Birmingham; Batson-Cook Co., West Point, Ga., general contractor; Birmingham Ornamental Iron Co., Birmingham, awarded structural steel.

200 tons, social service building, Minneapolis, to Paper, Calmenson & Co., St. Paul.

195 tons, substructure and approaches, bridge, Altoona creek, Barlow county, Georgia, to W. C. Caye & Co., Atlanta; Coffee Construction Co., Eastman, Ga., general contractor.

178 tons, bridge, Zumbro river, Rochester, Minn., to Paper, Calmenson & Co., St. Paul.

128 tons, sanitary district pump and blower house, Stickney, Ill., to Joseph T. Ryerson & Son Inc., Chicago.

125 tons, Continental bakery addition, Seattle, to Bethlehem Pacific Coast Steel Corp., Seattle; Poston Construction Co., Seattle, general contract.

100 tons, Waite Park school, to U. S. Steel Supply Co., Chicago.

REINFORCING BARS PENDING

693 tons, Veterans Administration general hospital, Chicago; J. L. Simmons Co. Inc., that city, apparent low bidder.

550 tons, Greyhound bus terminal, Chicago; bids in.

500 tons, court house and city hall, Quincy, Ill.; bids asked.

400 tons, Holy Cross seminary, LaCrosse, Wis.; bids asked.

360 tons, miscellaneous bridge, Cook county, Ill.; bids asked.

273 tons, generating plant, Elk River, Minn.; bids asked.

250 tons, also 75 tons shapes, power substation; bids to Seattle, Sept. 29.

210 tons, bridge, Aurora, Ill.; bids asked.

200 tons, American Institute of Baking, Chicago; bids in.

200 tons, state highway projects, Washington state; bids to Olympia Sept. 23.

141 tons, Weber high school, Chicago; bids asked.

135 tons, Certain-teed Products Corp. facility, Ft. Dodge, Iowa; bids asked.

100 tons plus, two Washington state highway bridges; general contracts placed.

Unstated, four apartment buildings in Juneau and Anchorage, Alaska, estimated cost $2,399,000; general contracts placed.

Unstated, baseball stadium and office for Portland, Oregon, Baseball Co., bids Sept. 22.

Unstated, apartment site No. 1, Chicago Housing Authority, Chicago; bids Oct. 11.

Unstated, physical education and music building, LaGrange, Ill.; bids taken Sept. 15.

Unstated, men's dormitory, Elmhurst College, Elmhurst, Ill.; bids asked.

PLATES . . .

PLATES PLACED

Unstated, four storage tanks for The Texas Co., at Olympia, Wash., to Chicago Bridge & Iron Co., Chicago.

Unstated, 5400 feet steel water pipe and fittings, for Walla Walla, Wash., to Armco Drainage & Metal Products Co., Portland, Oreg., $12,906.

PLATES PENDING

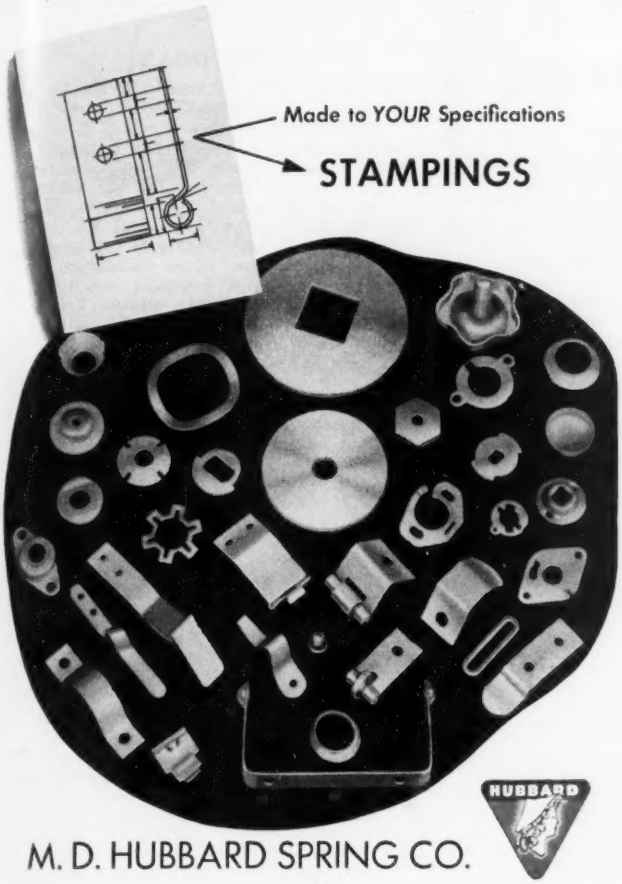
Unstated, elevated water storage tank and tower, 100,000-gal. capacity; alternative bids steel or wood to U. S. Engineer, Walla Walla, Wash., Oct. 4.

RAILS, CARS . . .

LOCOMOTIVES PENDING

Long Island Railroad, eight 2000-horsepower diesel-electric passenger locomotives; court authority sought for purchase of equipment from Fairbanks-Morse & Co., Chicago.

Northern Pacific, six 6000-horsepower diesel-electric road locomotives and twelve 1000-horsepower diesel-switch engines; purchase authorized by directors.



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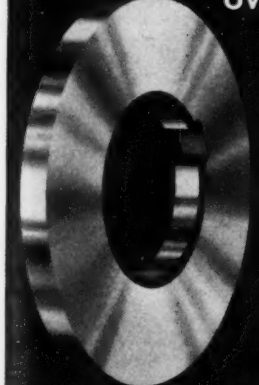

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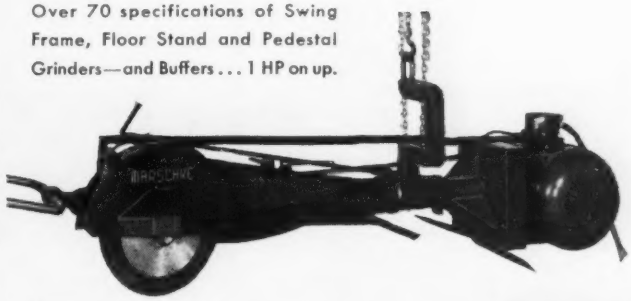

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CONSTRUCTION AND ENTERPRISE

ALABAMA

GADSEN, ALA.—Bomar Transportation, 702 Forrest Ave., has awarded a contract to Stickney Construction Co. for an office and warehouse; D. O. Whildin, Empire Bldg., Birmingham, architect.

SHEFFIELD, ALA. — Electro Metallurgical Co., Niagara Falls, N. Y., has awarded a contract to C. G. Kershaw Contracting Co., Birmingham, for a plant.

ARKANSAS

PINE BLUFF, ARK.—Larkin Lectro Products Corp., New York, is considering plans for establishment of a plant at Pine Bluff arsenal for manufacture of transformers and arc welding machines; installation of $350,000 in equipment would be involved.

FLORIDA

FORT LAUDERDALE, FLA.—Broward Truck & Equipment Co. has plans in progress for sales and shop building, Federal Highway; Gamble, Pownall & Gilroy, 1407 E. Las Olas Blvd., architect.

FORT LAUDERDALE, FLA.—Peninsular Supply Co., 210 N.W. Fifth St., received bids Sept. 17 for a warehouse and office building, S.W. 20th street and S. Andrews avenue; William T. Vaughn, 909 E. Las Olas Blvd., architect.

ORLANDO, FLA.—Dr. P. Phillips Co. received bids Sept. 12 for a fertilizer plant; plans by Smith Steel Construction Co., Jacksonville, Fla.

GEORGIA

ATLANTA—M. S. Nix has awarded a contract to H. B. Nelson Co., 3750 N. Stratford Rd. N.E., for a shop and office building; R. Kennon Perry, Mortgage Guarantee Bldg., architect.

ILLINOIS

DECATUR, ILL.—Construction of a soybean oil extraction plant will be started by A. E. Staley Mfg. Co. as part of a program for modernizing its processing facilities. Construction awarded H. K. Ferguson Co., Cleveland, also calls for an addition to preparation building, where soybeans are made ready to go through the oil extraction process, and expansion of underground storage for hexane. Contract had previously been awarded Blaw-Knox Co. for engineering work on the new building and for supplying principal machinery. Contract for installation of machinery has not yet been awarded. The entire project will, it is estimated, cost more than $2.5 million, spent by the company on its first soybean oil extraction plant completed four years ago.

KENTUCKY

JENKINS, KY.—Clinchfield Coal Corp., Pound, Va., will receive bids Sept. 30 for a modern coal tipple, Bold Camp.

TONER, KY.—Blue Diamond Coal Co. will receive bids Sept. 30 for coal tipple at Blair Fork, cost $500,000.

WAYLAND, KY.—Caney-Elkhorn Coal Co. will receive bids Sept. 25 for tipple near Wayland, cost $250,000.

WHITESBURG, KY.—Line Fork Cannel Coal Co. will receive bids Sept. 30 for improvements and new tipple, Line Fork, cost $150,000.

WHITESBURG, KY.—Marlowe Coal Co. will receive bids Sept. 25 for improvements to mine operations, Camp Branch; will install modern machinery, cost $50,000; tipple improvements and extensions, $50,000.

MARYLAND

GEYNDON, MD.—Gettier-Montayne Co. Inc., 405 W. Franklin St., Baltimore, received bids Aug. 29 for office building, Prospect avenue; Harry L. Wirsing, 130 W. Hamilton St., Baltimore, architect.

MICHIGAN

BAY CITY, MICH.—Thomson Welder Co. has awarded a contract to Cecil M. Kelly for a manufacturing building.

BIRMINGHAM, MICH.—Giffels & Vallet Inc., L. Rossetti, Detroit, architect, is preparing plans for an office building and warehouse to cost $3 million for Dearborn Motors Corp.

COLDWATER, MICH.—City of Coldwater will take figures Sept. 14 for an addition to its generating station, estimated cost $300,000; Emery, Marker & Emery, engineer, Toledo, O.

DETROIT—John C. Westphal Co. is erecting a factory addition, Military avenue, for Johnstone Tool & Machinery Co.; also a factory addition on Northlawn avenue for Paramount Rubber Co.

DETROIT—Delsoy Products Inc. has awarded a contract to Harold Bryce for an office and factory building.

FERNDALE, MICH.—Drake Printing Co., Detroit, is reported to be considering erection of a $1 million printing plant.

ST. JOSEPH, MICH.—Preliminary plans are being prepared by Consoer, Townsend & Associates, Chicago engineer, for a $1.5 million sewage treatment system for cities of St. Joseph and Benton Harbor, Mich.

YPSILANTI, MICH.—E. R. Little Co., Detroit, has been selected to prepare plans for a power plant and connecting services at Michigan State Normal College, estimted cost $1 million.

OHIO

AKRON—Incorporation papers have been filed for Akron Bronze & Aluminum Inc., an established firm at 501 Morgan St. Incorporators are Howard C. Walker, James E. Alpeter and Peggy Farkas with Woodrow D. Harris, 209 Second National Bldg., statutory agent.

KENT, O.—Trustees of Kent State University have approved plans for construction of an industrial arts and applied sciences building, a $1,000,000 project. Work is to begin immediately.

WOOSTER, O.—Wooster Stainless Co. has been incorporated by Joseph E. Fishelson, also agent, 818 Scovel Ave., John C. Halloran and Jack H. Critchfield.

PENNSYLVANIA

PITTSBURGH—A new $20 million neuropsychiatric hospital will be built for Veterans Administration, bids to be opened Nov. 15. The project will be supervised by Pittsburgh District Corps of Engineers.

WISCONSIN

BARABOO, WIS.—Industrial Coils Inc. is a new firm which will manufacture electronics equipment, and is located in part of the Deppe Bldg. on Water street. Formerly this coil manufacturing operation was part of Anaconda Wire & Cable Co., Muskegon, Mich. Equipment for the Baraboo plant is being moved from Muskegon. William B. Kieffer is president of the company, Earl S. Moss, secretary and treasurer.

BELOIT, WIS.—Taylor Freezer Co. suffered an estimated $400,000 damage by fire of which $100,000 was damage to the firm's building, and $300,000 to contents and inventory. The company will resume work as soon as re-construction of the plant can be completed.

MERRILL, WIS.—Lincoln Foundry Co. Inc. and two warehouses in the same building were destroyed by fire; estimated loss $70,000.

MILWAUKEE — Luick Dairy Co. and Luick Ice Cream Co. announce a $2 million building program in which three new buildings will be constructed on the south side of E. Capitol drive at N. Holton street. Plans call for a dairy, ice cream plant and a garage; Lawrence Peterson & Associates, consulting engineer.

MILWAUKEE—Fire of undetermined origin caused damage estimated at several thousand dollars in the No. 7 erecting plant of Allis-Chalmers Mfg. Co.; damage was confined to the contents of the building.